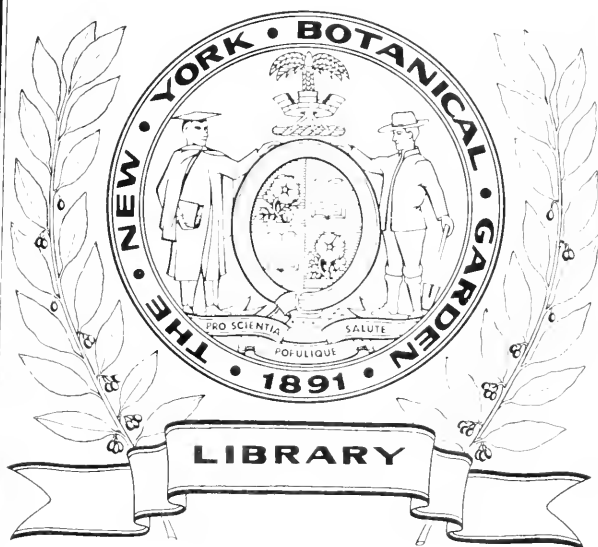


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A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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1. ANONYMOUS. Planteavlén i 1919. [Plant production in 1919.] Tidsskr. Landokonomi (Kjöbenhavn) 1920: 284-298. 1920.—During the last two years of the world war and the first year following the war, the shortage of grass seed and red clover seed was acute, resulting in a greatly decreased acreage of grass and clover during 1919. The opinion is ventured that the decrease is temporary, since heavy importation of seed was received from the United States during the spring of 1920. As compared with pre-war planting, the 1919 acreage of wheat was decreased; rye was about the same; barley was increased slightly; sugar beets were increased about 20 per cent; potatoes about 35 per cent; and the area planted to vegetables was considerably increased. The harvest of 1919 is described; it is stated to have averaged about 107 per cent of normal.—*Albert A. Hansen.*

2. ANONYMOUS. Cultivation of main crop potatoes. Jour. Dept. Agric. Ireland 20: 217-227. 1920.

3. ANONYMOUS. Field experiments, 1919. Jour. Dept. Agric. Ireland 20: 167-174. 1920.—Summarizes results of variety tests made in Ireland with barley, mangels, oats, potatoes, turnips, and wheat.—*Donald Folsom.*

4. ANONYMOUS. Notes. Nature 105: 80-81. 1920.—Note on organization of British Empire Sugar Research Association to further the development of the industry.—*O. A. Stevens.*

5. ANONYMOUS. American books on agriculture. [Rev. of: GEHRS, JOHN H. Productive agriculture. xii + 426 p. Macmillan & Co.: London, 1917.] Nature 104: 495-496. 1920.—A textbook for "school children of the upper classes who propose to take up farming as the business of their lives."—*O. A. Stevens.*

6. ANONYMOUS. Sulphur as a fertilizer for wheat. Agric. Gaz. New South Wales 31: 462. 1920.—Results of 4 years' trials at Cowra gave negative results.—*L. R. Waldron.*

7. ANONYMOUS. Applied plant morphology. [Rev. of: BARBER, C. A. Studies in Indian sugar canes. Mem. Dept. Agric. India Bot. Ser. 10: 39-153. 1919.] Nature 104: 578. 1920.—A study of the underground branching of the plant of wild and cultivated forms of sugar cane and an attempt to correlate morphological characters with economic values. This is referred to as the fourth paper on the Indian sugar canes.—*O. A. Stevens.*

8. ANONYMOUS. (REICHS AUSSCHUSS FÜR ÖLE UND FETTE.) Zur Frage des Anbaues und der Akklimatisierung der Soja in Deutschland. [Concerning the cultivation and the acclimatization of the soy bean in Germany.] Naturwiss. Zeitschr. Forst- u. Landw. 18:36-38. 1920.—The bureau of fats and oils in its search for new fats and oils since the war made a thorough study of the advisability of introducing the soy bean on a large scale, but has reached the conclusion that regardless of its longer vegetative period, it does not approach in yield the common dwarf bean (*Phaseolus nanus*). Late ripening crops of the soy bean developed very little or no seed at all. There is little hope that further experimentation in cultivating and breeding will result in producing a soy bean ripening early enough and producing large enough yields to make its planting in the most favorable parts of Germany a success.—J. Roesser.

9. ANONYMOUS. Cane experiment in St. Croix. Agric. News [Barbados] 19: 180, 181, 196. 1920.—A review of the work done with sugar cane at the Slob Experimental Station during 1919-20, as reported by EDUARD GEDDE, manager. Results of experiments show that it is advantageous to plant canes equal distances apart in both directions. Cane planting experiments with cuttings obtained from plant, first, and second ratoon canes, gave results in favour of those taken from first ratoons, since these gave 4 tons more per acre than those from plant canes and $1\frac{1}{2}$ tons more than those from second ratoons. Carefully conducted comparative experiments with planting cane in flat and banked plats gave results in favor of the former from the points of view of yield and of cultivation costs.—J. S. Dash.

10. ANONYMOUS. Agriculture and industries in the Turks and Caicos Islands. Agric. News [Barbados] 19: 3. 1920.—This is a review of G. W. SMITH's 1918 report as Commissioner for the Turks and Caicos Islands. Mention is made of the introduction into the colony of seeds of both Sea Island and Upland strains of cotton which were brought by settlers from the United States who were granted lands there by the British Government after the American War of Independence. Never cultivated, plants from these seeds were allowed to grow at will in waste places near the settlements "Where amid cactus shrub they pursued for over a century a struggle for existence, evolving eventually a type of cotton plant that for hardiness, freedom from disease and heavy cropping qualities, under almost unbelievable conditions of sterility and neglect, cannot, it is believed, be surpassed anywhere."—J. S. Dash.

11. ANONYMOUS. Seedling canes experimented with in Antigua in 1919. Agric. News [Barbados] 19: 7. 1920.—In this review of a report on sugar cane presented to the Agricultural and Commercial Society by A. E. COLLENS, it is stated that the White Transparent is the variety most cultivated. As plant cane, its calculated yield for 1919 was 15.45 tons of cane per acre; and as ratoons, 12.06 tons. The calculated sucrose content was 2.11 pounds, and 1.99 pounds per gallon of juice, respectively. In the experiments, B. 6308 came first as plant cane with an average of 23.4 tons of cane per acre and 2.08 pounds sucrose per gallon. The best ratooning cane was found to be B. 10650.—J. S. Dash.

12. ATKINSON, ESMOND. Weeds and their identification. New Zealand Jour. Agric. 20: 168-171. 1 pl. 1920.—This article deals with perennial Sow Thistle (*Sonchus arvensis*). The plant and its habits are described. It has been in New Zealand for many years. It need not be considered serious in pastures, as sheep eat it readily. In cultivated land the weed may be eradicated by the use of a smothering crop, such as oats and tares, or Wearora vetchling; or the land may be put into grass for a couple of years.—N. J. Giddings.

13. BREAKWELL, E. Improvement of sweet sorghums. Agric. Gaz. New South Wales 31: 549-551. 1920.—See Bot. Absts. 7, Entry 168.

14. BREAKWELL, E. Popular description of grasses. Agric. Gaz. New South Wales 31: 507-512. 2 fig. 1920.—Deals with the introduced *Chloris* grasses and describes in some detail the agronomic relations of Rhodes grass (*Chloris gayana*). The annual *C. virgata* is not considered of much economic importance.—L. R. Waldron.

15. BROWN, ERNEST B. **Relative yields from broken and entire kernels of seed corn.** Jour. Amer. Soc. Agron. 12: 196-197. 1920.—A lower percentage of the broken seed germinated, and the seedlings were weaker than those produced by whole kernels. In weight of ear and yield per plant the broken seed produced consistently less than did the entire seed. The broken seed produced 7.6 bushels less per acre than did the entire seed.—*F. M. Schertz.*

16. BRUCE, J. L. **Rotation of crops.** New Zealand Jour. Agric. 20: 94-96. 1920.—A 6-year rotation for dairy farms is suggested. This included 3 years in grass; 1 year in roots; 1 year in flax, barley, beans, potatoes, linseed, etc.; and 1 year in oats and tares.—*N. J. Giddings.*

17. C., C. **The roast beef of old England.** [Rev. of: MACKENZIE, R. J. J. *Cattle and the future of beef production in England.* With a preface and chapter by F. H. R. Marshall. xi + 168 p. University Press. Cambridge, 1919)]. Nature 105: 62-63. 1920.—Author considers a supply of prime beef necessary to a sound system of agriculture. The increase of plow-land at expense of grass-land during the war is now in process of reversal, and this may proceed at an increasing rate unless there is evidence of greater profit in crops other than grass.—*O. A. Stevens.*

18. CALVINO, MARIO. **Estudio sobre el cultivo de la soya en Cuba.** (A study regarding the cultivation of the soy bean in Cuba.) Rev. Agric. Com. y Trab. [Cuba] 3: 124-131. 9 fig. 1920.—Trials of 13 varieties of soy beans (*Soja max* L.) are described with reference to germination, time of emergence, length of growing season, yield and nutritive value.—*F. M. Blodgett.*

19. COCKAYNE, L. **An economic investigation of the montane tussock—grassland of New Zealand.** New Zealand Jour. Agric. 20: 82-94. 11 fig. 1920.—Several depleted areas which have been protected by rabbit-proof fences are showing great improvement. A reasonable amount of pasturing apparently does not interfere with the regeneration. Valuable forage grasses spread from the tussocks, and many seedling plants soon develop. The plants found in these areas are listed.—*N. J. Giddings.*

20. COLWELL, W. R. **Under irrigation with bore water.** Agric. Gaz. New South Wales 31: 476-477. 2 fig. 1920.—Excellent returns were obtained from Sudan grass at the Coonamble Experiment Farm with the assistance of irrigation from bore water.—*L. R. Waldron.*

21. DOWNING, R. G. **Sugar-beet growing in Victoria.** Agric. Gaz. New South Wales 31: 463-465. 1920.—Summary of results showing profits made by farmers and how sugar-beet production is related to other phases of crop production.—*L. R. Waldron.*

22. FABER, HARALD. Foreword by SIR ROBERT GREIG. **Forage crops in Denmark.** ix + 100 p. Longmans, Green and Co.: London, 1920.—This volume, written in English, describes the progress that has been made in recent years in the improvement and culture of forage crops and the development of the trade in guaranteed seeds in Denmark. The book is of unusual interest to all engaged in the development and utilization of improved crops and in the betterment of the seed trade. One-half of the work is devoted to root crops. Following the investigations of Fjord published in 1890, which showed that the dry matter in roots was equal in feeding value to grain for cows and swine, the acreage of root crops in Denmark has been increased sevenfold; namely, from 95,000 acres in 1888 to 678,000 acres in 1919. Before this time breeding of improved root crops had made considerable progress, the initiative being due both to progressive farmers and to enterprising seed firms, who later formed the "Society for the Production of Home-Grown Seed." The success achieved in developing and establishing improved strains of root crops has been remarkable, and since 1894 has been assisted by the government. The methods employed are described in detail.—The improvement of grasses in Denmark began with the work of P. NIELSEN in 1869. He introduced the system of testing grasses in small duplicate plats instead of in large fields,

and in 1896 became the first director of the state experimental farm at Tystofte. With this work began the systematic testing of grass seeds of different strains and from various countries, and the development of special seed farms was a subsequent outgrowth of this movement. Later a system was introduced of making comparative trials of lots of grass and clover seed submitted by growers and dealers. This has stimulated the selection of special high-yielding strains, especially of grasses and of white clover, of which the Mors strain is best. In the trials, samples of orchard grass (cocksfoot), Italian rye-grass, meadow fescue, tall oat-grass, timothy, red clover, white clover, and bird's-foot trefoil were tested. So far as reported, the native Danish strains were in every case the best.—The last chapter is devoted to the development of trade in guaranteed seeds. This again was initiated by farmers and seedsmen, but later its control was taken over by the government. The success of the whole movement is indicated not only by the much increased acreage of high-yielding forage crops, but also by the fact that Denmark now exports much seed, while formerly it was a large importer.—*C. V. Piper.*

23. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. [Restrictive legislation and notices of quarantines in U. S. A.] Service and Regulatory Announcements 68: 52-111. 1920.

24. FISHER, M. L. The dormant period of timothy seed after harvesting. Proc. Indiana Acad. Sci. 1918: 276-279. 1920.—Reports in 2 tables results of timothy seed germination. After 25 days the germinating percentage of seeds from individual heads averaged 98.2 per cent while in mass selections it was 88 per cent. Three or 4 weeks after harvesting, timothy seed has reached its maximum germinating power.—*F. A. Anderson.*

25. FURBY, E. Wheat experiments for hay. Yanco experiment farm, 1919. Agric. Gaz. New South Wales 31: 467-471. 1920.—Several standard varieties of wheat were used. Early sowing gave best results.—*L. R. Waldron.*

26. GASSER, G. W. Report of the work at Rampart station. Rept. Alaska Agric. Exp. Sta. 1917: 34-57. Pl. 3-4. 1919.—Reports on the behavior of alfalfa (*Medicago falcata* and *M. sativa*), bird vetch (*Vicia cracca*), field peas, chick pea (*Cicer arietinum*), clover (*Trifolium pratense* and *T. lupinaster*), winter and spring wheat, winter and spring rye, barley, oats, buckwheat, hemp, millet, flax, and potatoes. Nearly all the winter wheat was killed by freezing, but rye was not. Spring rye matured too late. Barley, oats, and most varieties of spring wheat matured well. This station is devoted chiefly to grain breeding, and a large proportion of the varieties grown originated here. Two fruits—the first grown in the interior of Alaska—were produced on a Siberian Crab tree. Strawberries of varieties bred at Sitka have survived several winters and have fruited abundantly. Reports are also given on garden vegetables and annual flowering plants.—*J. P. Anderson.*

27. GEORGESON, C. C. Reports from seed and plant distribution. Rept. Alaska Agric. Exp. Sta. 1917: 86-90. 1919.—See Bot. Absts. 7, Entry 269.

28. GEORGESON, C. C. Summary of the work at the several stations. Rept. Alaska Agric. Exp. Sta. 1917: 5-33. 2 pl. 1919.—See Bot. Absts. 7, Entry 270.

29. GÉROME, J. Essais de culture de Pommes de terre avec des tubercules appauvris ou anormaux (1919). [An experiment in growing potatoes from depauperate or abnormal tubers.] Bull. Mus. Hist. Nat. [Paris] 25: 677-681. 1919.—Results of this experiment in the vicinity of Paris with 9 varieties are given in tabular form. "Early rose" proved most satisfactory, and "Up to date" and "Prime bretonne" gave encouraging results.—*E. B. Payson.*

30. HAMBLIN, C. O. To infect lucerne seed with nodule organism. Agric. Gaz. New South Wales 31: 466. 1920.—Recommends using soil from an old lucerne (alfalfa) field, allowing the soil to dry well in the shade. The author states that the bacteria from artificial (laboratory) cultures are weaker than those produced under natural conditions.—*L. R. Waldron.*

31. HANLY, JOSEPH. Some notes on crop rotations. Jour. Dept. Agric. Ireland 20: 184-189. 1920.—Discusses crop rotation in regard to its historical development, its advantages, and the types practiced in Ireland.—*Donald Folsom.*

32. HARLAN, HARRY V. Smooth-awned barleys. Jour. Amer. Soc. Agron. 12: 205-208. 1920.—A report on the introduction of smooth-awned barley and the progress that has been made. It is predicted that a high-yielding smooth-awned barley will be developed.—*F. M. Schertz.*

33. HARSHBERGER, JOHN W. Text-book of pastoral and agricultural botany for the study of the injurious and useful plants of country and farm. ix + 294 p., 1 pl., 120 fig. P. Blakiston's Sons and Co.: Philadelphia, 1920.—This book is based on a course in botany given to veterinary students in the University of Pennsylvania. Nine chapters are devoted to poisoning by plants, one to feeds and feeding, three to grasses, three to legumes, one to weeds, and one to agricultural seeds.—*C. V. Piper.*

34. MAIDEN, J. H. Chats about the prickly pear. No. 5. Agric. Gaz. New South Wales 31: 557-562. 1920.—Mainly extracts from well-known bulletins by two American authors, HARE and GRIFFITHS, on value and methods relative to *Opuntia* spp. as feed for live stock.—*L. R. Waldron.*

35. MAUGHAN, HOWARD J. Factors affecting the depth of planting various crops. (Abstract.) Utah Acad. Sci. 1: 206-207. 1918.

36. McCAULEY, C. Sudan grass in western districts. At Cowra experiment farm. Agric. Gaz. New South Wales 31: 473-475. 1920.—Detailed financial statement is given of results from 20 acres of this grass, showing it to have been very profitable. An analysis of Sudan-grass silage is given.—*L. R. Waldron.*

37. MOOMAW, LEROY. Report for the Dickinson substation for 1919. North Dakota Agric. Exp. Sta. Bull. 138. 24 p., 6 fig. 1920.—Weather data relative to temperature, precipitation, wind velocity, and length of growing season are presented, as well as annual and average yields of different varieties of various crops. In an excessively dry season following two dry seasons Russian thistle (*Salsola kali tragus*) produced 5.7 tons per acre of air-dry material (hay).—*L. R. Waldron.*

38. MOORE, C. C. Technic of potato starch manufacture. Potato Mag. 2¹²: 10, 11, 20, 22-23; 3¹: 8, 9, 20, 22-23. 1920.

39. MOREILLON, M. Influence de l'ombrage sur la valeur des gazons dans les pâturages boisés. [The influence of shade upon the value of the grasses in wooded pastures.] Jour. Forest. Suisse 70: 131-142. 1919.—A discussion of Swiss alpine meadows at altitudes from 1100 to 1650 meters. As a result of the shade of trees in these alpine pastures, there is not only a reduction in the percentage of good forage plants but also in the quantity of fodder harvested. Under spruce the loss in dry fodder is 83 per cent by weight and under larch at the same station from 30 to 45 per cent of that in open ground. The shade is also injurious to the qualitative value of the fodder. In Zürich and Grisons the following figures were obtained.

Weights represent kilograms per are; i.e., $\frac{1}{100}$ acre

PARCELLE	PROTEIN	FAT	SOLUBLE SUBSTANCES, NON- NITROGENOUS	TOTAL
Open.....	4.55	1.43	15.24	21.22
Shaded.....	3.67	1.05	10.55	15.27

In a pasture with spruce trees 20 meters apart the forage will lose 60 per cent in weight and 30 per cent in quality; its end value is therefore but 20 per cent of the end value of forage grown in full sunlight. In conclusion, specific recommendations are presented for improving the management and administration of Swiss alpine pastures.—*C. J. Kracbel*.

40. MURRAY, J. ALAN. **The classification of cattle foods.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 383. 1920.

41. OLDERSHAW, A. W. **The value of lupines in the cultivation of poor light land.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 380-381. 1920.

42. PITT, J. M. **Farmers' experiment plots. 1919-20. Central Coast. Agric. Gaz. New South Wales 31: 539-547. 1920.**—Experiments included variety trials, fertilizer trials, and size of seed piece, depth and rate of planting.—*L. R. Waldron*.

43. PORTER, W. R. **Thirteenth and fourteenth annual report of the state demonstration farms 1918 and 1919.** North Dakota Agric. Exp. Sta. Bull. 135. 84 p., 1 fig. 1920.—Detailed results are given from 22 farms, including cost of production; a summary of results for 10 years is presented for 9 of the farms. Wheat has yielded 16.9 bushels per acre for 14 years, which is 54 per cent higher than the state average for the same period.—*L. R. Waldron*.

44. PRATT, HIRAM E. **Report of work at Kodiak live stock and breeding station.** Rept. Alaska Agric. Exp. Sta. 1917: 72-81. 1919.—Reports on field and forage crops grown at the station. Twelve varieties of potato were tested. The following native plants were used for silage, beach rye (*Elymus mollis*), beach sedge (*Carex cryptocarpa*), bluetop (*Calamagrostis langsдорffi*), and fireweed (*Epilobium angustifolium*). These do not stand continual cutting well, but the yield is maintained if cutting is done only in alternate years. Native bluetop is the chief hay grass; but coarse bluegrass (*Poa glumaris*), Kentucky bluegrass (*Poa pratensis*), and wild barley (*Hordeum boreale*) occur mixed with bluetop, and make good hay. Analyses of *Calamagrostis langsдорffi*, *Carex cryptocarpa*, and *Elymus mollis* are given and compared with such standard grasses as *Poa pratensis*, *Agrostis alba*, and *Phleum pratense*.—*J. P. Anderson*.

45. PRIDHAM, J. T. **The selection of promising wheat plants.** Agric. Gaz. New South Wales 31: 548. 1920.—See Bot. Absts. 7, Entry 234.

46. RAMSAY, A. A. **Sorghum as a possible source of industrial alcohol.** Agric. Gaz. New South Wales 31: 479-484. 1920.—Experiments were conducted at Hawkesbury Agricultural College with different varieties of sorghum. Results are given in detail of the field data, percentage of juice expressed, its analysis, amount of alcohol produced, and composition of megass. It was found for most varieties that the market value of the alcohol obtained would not pay for the cost of cutting and transporting the cane to the factory. Even with the best variety the margin was only about 1s. per ton. Production of alcohol in this manner can not be considered a feasible undertaking.—*L. R. Waldron*.

47. REED, GEORGE M. **Varietal resistance and susceptibility of oats to powdery mildew, crown rust, and smuts.** Missouri Agric. Exp. Sta. Res. Bull. 37. 3-41. 1920.

48. ROBERTS, GEORGE, AND A. E. EWAN. **I. Report on soil experiment fields. II. Maintenance of fertility.** Kentucky Agric. Exp. Sta. Bull. 228: 89-131. 1920.—See Bot. Absts. 7, Entry 463.

49. ROUND, LESTER A. **Experiments with potato silage.** Potato Mag. 3³: 6-7, 29-31. 2 fig. 1920.

50. SHEPHERD, A. N. Summer green fodder trials. Murrumbidgee irrigation area, 1919-1920. Agric. Gaz. New South Wales 31: 554-556. 1920.—General cultural notes for sorghum and maize grown for summer green fodder, and the yields obtained at the various places of experimentation. The heaviest yield was 25.5 tons per acre with *Sorghum saccharatum* following lucerne.—*L. R. Waldron*.

51. SNODGRASS, M. D. Report of the work at Fairbanks station. Rept. Alaska Agric. Exp. Sta. 1917: 57-72. Pl. 5-7. 1919.—Ninety-five acres were cropped with small grain and five acres with root crops. Nearly all the winter grain was killed by freezing. Owing to drought in May and first half of June, spring grains yielded only half as much as usual. This drought also caused uneven germination and consequent uneven ripening. Three varieties of spring wheat, 2 of oats, and 2 of barley were grown under field conditions, and larger numbers were grown in small plots or in head-to-row tests. A spring wheat originally received from Irkutsk, Siberia, in 1914, and known as H. G., is considered the best wheat for the region. Grown under different rotations and exposures, it showed considerable differences in yield. Japanese buckwheat was successfully grown. Reports are given on the behavior of field peas, alfalfa, and clover. Red clover winter kills, but grew 24-30 inches high by September 7 from spring seeding. Grains are grown for hay. *Calamagrostis langsdorffii* produces the native hay. The potato is the chief money crop of the region. Results of the tests at the station are given. Some potato blight and a very little scab were present. Petrowski turnip is another important crop of this region, and seed is grown and distributed by the station. Notes are given on garden vegetables and on flowers; also on strawberries, red raspberries, and native berries. Twenty-five requests for seed were filled.—*J. P. Anderson*.

52. SNODGRASS, M. D. Cooperative work. Rept. Alaska Agric. Exp. Sta. 1917: 84-86. 1919.—Gives report of cooperative work among the farmers of the Matanuska valley and the Anchorage-Knik region in southern Alaska.—*J. P. Anderson*.

53. SOMERVILLE, W. [Presidential address.] Grass. Rept. British Assoc. Adv. Sci. 1919: 364-379. 1920.—From the experiments which have been carried out, the following conclusions may be drawn: "(1) That the quality of a pasture is not primarily dependent on its botanical composition, though, as a rule, the presence of white clover, and other Leguminosae is indicative of high feeding value. (2) That poor pastures, especially on clay soil, can be rapidly and profitably improved by the use of phosphates, especially basic slag. (3) That, as a rule, phosphates alone are sufficient to effect and maintain the improvement, and that, of supplementary substances, potash and lime are occasionally worthy of attention. (4) That the improvement of poor pasture is very dependent on the presence of Leguminosae, and especially of white clover. (5) That renovating with the seed of wild white clover may, in the absence of natural Leguminosae, be a necessary preliminary or concurrent operation. (6) That cake can rarely be used at a profit, and that, as an agent in improving poor pasture, it occupies an unsatisfactory position. (7) That nitrogen, whether in the form of artificial manure, or as cake residues, when added to phosphates for pasture, is always unnecessary and frequently detrimental. (8) That, in the case of hay on permanent grass land, equal weights of produce may have very different feeding values. (9) That few forms of agricultural expenditure are more certain in their results than the judicious use of manures on grass land, and that the meat and milk producing capacity of the country can be largely and rapidly increased, with great pecuniary gain to the farmer, and still greater economic advantage to the nation."—*C. L. Wilson*.

54. SYME, J. E. The grain wheats for central western districts. Farmers' experiment plots, 1909-1919, summarized. Agric. Gaz. New South Wales 31: 533-538. 1920.—"Federation," "Marshall No. 3," "Cranberra" and "Hard Federation" did best.—*L. R. Waldron*.

55. SYME, J. E. In a dry season at Parkes. Agric. Gaz. New South Wales 31: 477-478. 1920.—Discusses Sudan grass and considers it valuable.—*L. R. Waldron*.

56. TRUAX, H. E. United States grades for potatoes. *Potato Mag.* 3¹: 15. 1920.

57. WATTS, GEORGE. Cotton growing in the British Empire. *Nature* 104: 694-696. 1920.—British mills are said to be adapted to use of American long-staple cottons and unable to use the shorter staples of India and other countries. Definite organization of a research institution is needed. The following suggestions were made: To establish in Manchester a college of cotton where experts and planters can be trained; to promote intensive study of races of all species of *Gossypium*, with careful records of all plantings; to establish branch colleges in the more important centers of cultivation to complete training for local conditions; to replace cultivation by natives on a small scale with plantations directed by trained people. Success of American cotton is attributed to the fact that the work was undertaken by intelligent farmers who evolved new and superior stocks and who did not have to contend with vested interests of native cultivators.—*O. A. Stevens.*

58. WENHOLZ, H. Papago: A new variety of sweet corn. *Agric. Gaz. New South Wales* 31: 552-553. 1 fig. 1920.—Seed was secured from Arizona. The variety is said to be remarkable because of the resistance of its pollen to dry heat. It is very late, of fair quality, and promising for Australian conditions.—*L. R. Waldron.*

59. WENHOLZ, H. Sweet corn. Variety trial, 1919-1920. *Agric. Gaz. New South Wales* 31: 585-589. 1920.—Fourteen varieties were tested, the seed coming from America. They averaged in yield 487 dozen ears per acre. The best yielding was Mammoth White Cory with 850 dozen ears, weighing 5.5 tons. Varieties are described and recommendations made.—*L. R. Waldron.*

60. WENHOLZ, H. Soil improvement for maize. I. Manures and fertilizers. *Agric. Gaz. New South Wales* 31: 495-501. 1920.—A report of results secured from the application of commercial fertilizers, especially phosphorus, upon maize for grain and fodder in various districts of the province. Trials were made upon farmers' experiment plats. Usually the application of the phosphorus in the shape of superphosphate showed a profit.—*L. R. Waldron.*

61. WENHOLZ, H. Pop-corn variety trial, 1919-1920. *Agric. Gaz. New South Wales* 31: 562. 1920.—An average yield of 40 bushels per acre is recorded.—*L. R. Waldron.*

62. WHEELER, H. J. Delayed application of fertilizer. *Potato Mag.* 2¹²: 5, 38. 1 fig. 1920.—Late application of fertilizer increased yield of potatoes in Wisconsin over that of unfertilized fields.—*Donald Folsom.*

63. ZIELSTORFF, W. Einsäuerungsversuch im Deutschen Futterturm mit anschliessendem Fütterungsversuch. (Ensiling experiment in German silo with connected feeding experiment.) *Mitteil. Deutsch. Landw. Gesell.* 35: 563-565. 1920.—A comprehensive series of experiments have been planned to determine the value of different methods of ensiling. The German farmer is chiefly interested in the ensiling of grass and clover in order to save this feed when weather conditions render it impossible to make hay. One experiment made under such conditions is described. Timothy that had already become quite old because the weather did not permit of cutting was ensiled. Feeding experiments with the ensilage produced showed that 100 kgm. of the ensilage had the same feeding value for milk cows as 170 kgm. of mangels.—*A. J. Pieters.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

64. ANONYMOUS. Dansk Landbolovgivning efter 1849. [Danish farm laws since 1849.] *Tidsskr. Landokonomi (Kjöbenhavn)* 1920⁷: 265-283. 1920.—A discussion of the agricultural laws passed by the Danish legislature since 1849. Particular attention is paid to the good and bad effects which these laws have had upon the farmers.—*Albert A. Hansen.*

65. ANONYMOUS. *The New Zealand science congress, 1919.* *Nature* 104: 516-518. 1920. A review of some papers, including presidential address of L. COCKAYNE, being an historical account of the institute. Notes that 654 papers on botany have been published in the first 50 volumes of transactions of the institute.—O. A. Stevens.

66. ANONYMOUS. *Publications of the staff, scholars and students of The New York Botanical Garden during the year 1919.* *Jour. New York Bot. Gard.* 21: 65-72. 1920.

67. C., N. R. *Scientific biography.* [Rev. of: BOWER, F. O. *Joseph Dalton Hooker.* 62 p. Macmillan and Co.: London, 1919.] *Nature* 104: 562. 1920.—"Scholarly but not interesting."—O. A. Stevens.

68. EBERHARD, JULIUS. *Die Technik der Naturverjungung einst und jetzt. Ein forstgeschichtliche Studie.* [The technique of natural reproduction formerly and now.] *Forstwiss. Centralbl.* 42: 161-183, 204-226. 1920.—See *Bot. Absts.* 7, Entry 116.

69. FREEMAN, W. G. *The centenary of the Royal Botanic Garden, Trinidad.* *Agric. News [Barbados]* 19: 36-37. 1920.—Sections of a paper originally contributed to the *Trinidad Guardian*, are reproduced. The Garden shares with those of Calcutta and Sydney the distinction of being the only ones in the British Colonial Empire which have reached 100 years or more of unbroken activity. Some account is given of the progress of the Garden under different Curators.—J. S. Dash.

70. GLEASON, H. A. *Organization of the American iris society.* *Jour. New York Bot. Gard.* 21: 39-40. 1920.—See *Bot. Absts.* 7, Entry 302.

71. LUISIER, A. o P. Fernando Theissen, S. J. *Broteria, Ser. Bot.*, 18: 73-78. 1920.—Father THEISSEN was killed early in September, 1919, by falling over a precipice while collecting alone near Feldkirch, Vorarlberg. He was born in Krefeld, Rhenish Prussia, July 27, 1877. A member of the Society of Jesus, he taught first in Brazil, later in several parts of central Europe. Father THEISSEN was a mycologist, contributing to many journals, especially the *Annales Mycologici*. *Thiessenula* Sydow and *Theissenia* Maublanc, were named in his honor.—A bibliography of 51 titles and notice of a posthumous work on the lichens of Vorarlberg is appended.—E. B. Chamberlain.

72. MORRIS, J. C. [Presidential address.] *Rept. British Assoc. Adv. Sci.* 1919: 316-331. 1920.—A review of recent British work in pure and applied botany, such as agronomy, pathology, and genetics. The application of pure botany to questions of economic importance is presented in the development of more valuable varieties of wheat, cotton, sugar cane, and rubber, and in improving the quality of the production of cacao, flax, and other crops. A reference is made to the prominent place which ecological studies will take in the future of botany. Recent work in tropical botany receives especial emphasis. The article is in general a summing-up of the great influence of botany upon the welfare of the human race.—A necrological review is presented.—C. L. Wilson.

73. P(RAIN), D. *James William Helenus Trail.* *Kew Bull. Misc. Inf.* [London] 1919: 378-388. 1919.—See also *Bot. Absts.* 6, Entry 935.

74. SMALL, J. K. *Of grottoes and ancient dunes.* *Jour. New York Bot. Gard.* 21: 25-38, 45-54. *Pl.* 241-244. 1920.

75. THÉRIOT, I. *Vandalisme et solidarité scientifique.* [Ruthlessness and scientific brotherhood.] *Rec. Publ. Soc. Havraise Études Diverses* 87: 131-135. 1920.—An account of the partial destruction and loss of the moss collections and drawings of JULES CARDOT of Charleville. Quotations from CARDOT's letters give an account of the state of his collection upon return to Charleville. The action of English and American bryologists in raising funds for the purchase of CARDOT's remaining herbarium on behalf of the Museum of Paris is described. [Cf. *Bot. Absts.* 5, Entry 2407.]—E. B. Chamberlain.

76. W., A. S. *Robert Etheridge.* *Nature* 104: 700-701. 1920.—Brief biography. Director of Australian Museum since 1895. Noted for work in palaeontology.—O. A. Stevens.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ALFRED GUNDERSEN, *Assistant Editor*

77. ANONYMOUS. *Awbury Arboretum*. Brooklyn Bot. Gard. Rec. 9: 23-24. 1920.—Digest of article in Bull. Geog. Soc. Philadelphia (July, 1919). Awbury Arboretum comprises over 30 acres at Washington Lane Station, near Philadelphia. It has been endowed by CAROLINE E. POPE and other members of the POPE family as an arboretum and refuge for migratory birds.—C. S. Gager.

78. ANONYMOUS. *Botanical guides*. [Rev. of: COOK, M. T. *Applied economic botany: based upon actual agricultural and gardening projects*. xviii + 261 p. J. B. Lippincott Co.: Philadelphia and London, 1919. (Farm Life Text Series.) See also Bot. Absts. 3, Entries 491.] Nature 105: 34-35. 1920.—Title is misleading; book as a whole is disappointing.—O. A. Stevens.

79. ANONYMOUS. *Botanical guides*. [Rev. of: (1) SULMAN, A. E. *Some familiar wild flowers*. ii + 65 p. (2) *Australian wild flowers*. ii + 67 p. Angus and Robertson: Sydney (no dates). (3) SULMAN, FLORENCE. *A popular guide to the wild flowers of New South Wales*. Vol. 2, xxi + 249 p., 71 pl. Same publisher, 1919.] Nature 105: 35. 1920.

80. ANONYMOUS. *Museums and the state*. Nature 105: 68-70. 1920.—Communications from 5 persons in response to article of March 11.—O. A. Stevens.

81. ANONYMOUS. *The state and the national museums*. Nature 105: 29-31. 1920.—A survey of British museums and plans for their futures. Separate museums have arisen in response to conditions rather than by a broad and general plan. Coördination is needed to enable each to fill a distinct and useful place.—O. A. Stevens.

82. ANONYMOUS. *The value of Botanic Gardens*. Agric. News [Barbados] 19: 193, 194. 1920.—It is pointed out that the value of these institutions "for the advancement and diffusion of a knowledge and love of plants" has only recently been appreciated to any extent; and in small communities it has not yet been realised. The writer considers that a botanic garden contributes to the well-being of the people from the social, educational, and scientific points of view.—J. S. Dash.

83. ANONYMOUS. *Prospectus of courses offered by the Brooklyn Botanic Garden, 1920*. Brooklyn Bot. Gard. Rec. 9: 1-18. 1920.

84. ANONYMOUS. *Education and research chiefly in relation to sugar and rice*. Agric. News [Barbados] 19: 167, 182. 1920.—In the course of a visit to Havana and New Orleans, the Scientific Assistant to the Imperial Department of Agriculture for the West Indies, W. R. DUNLOP, made a number of observations, of which an account is here given. A description is given of the various sugar and rice experimental stations visited, and also certain of educational institutions devoted to agriculture.—J. S. Dash.

85. ANONYMOUS. *Fern study*. Nat. Study Rev. 16: 235-257. 1920.—A very elementary presentation of the principal facts about the structure, growth, and life-history of ferns, with simple key and descriptions.—W. L. Eikenberry.

86. BOYNTON, K. R. *Vocational education in gardening for disabled and convalescent soldiers and sailors*. Jour. New York Bot. Gard. 21: 87-94. 1920.

87. BROWN, J. G. *A new economic botany*. [Rev. of: COOK, MEL T. *Applied economic botany*. xviii + 261 p. J. B. Lippincott Co.: Philadelphia and London, 1919.] Plant World 22: 309-311. 1919.

88. COWELL, ARTHUR WESTCOTT. *Awbury Arboretum Address*. Bull. Geog. Soc. Philadelphia 17: 98-102. July, 1919.—Gives brief outline of planting plans, which include a rose garden and a rhododendron vale. "The system of naming is that which will be found of greatest advantage to average people and students and nursery men, and the names adopted by the Committee upon Standardized Plant Names have been used. These are the terms found in most botanies and in the Cyclopedia of Horticulture."—C. S. Gager.

89. ENGLER, A. *Bericht über den Botanischen Garten und das Botanische Museum zu Berlin-Dahlem*. vom 1. April 1918 bis zum 31. März 1919. [Report on the Botanical Garden and Botanical Museum at Berlin.] Notizbl. Bot. Gart. Berlin 7: 331-344. 1919.

90. ENGLER, A. *Bericht über den Botanischen Garten und das Botanische Museum zu Berlin-Dahlem*. vom 1. April 1919 bis zum 31. März 1920. [Report on the Botanical Garden and Botanical Museum at Berlin.] Notizbl. Bot. Gart. Berlin 7: 455-466. 1920.

91. G[AGER], C. S. *Prospects for a new national botanic garden*. Brooklyn Bot. Gard. Rec. 9: 20-22. Jan., 1920.

92. GARRETT, A. O. *The influence of biological investigations upon the other sciences*. Utah Acad. Sci. 1: 68-77. 1918.

93. HARSHBERGER, JOHN W. *Text-book of pastoral and agricultural botany for the study of the injurious and useful plants of country and farm*. ix + 294 p., 1 pl., 120 fig. P. Blakiston's Sons & Co.: Philadelphia, 1920.—See Bot. Absts. 7, Entry 33.

94. KARRAKER, P. E. *Notes on the conference on elementary soil teaching, held at Lexington, Kentucky, June, 1920*. Soil Sci. 10: 247. 1920.—The elementary work on soils should be a course of 5 semester hours credit given in the sophomore year. The minimum prerequisites should be one year of general inorganic chemistry, one term of general geology, and high school or college physics. At least three-fifths of the time should be spent in lecture or recitation, and a standard textbook should be used.—W. J. Robbins.

95. LANKESTER, E. RAY. *Museums and the state*. Nature 105: 100-101. 1920.—Favors separation of botany, zoology, etc. in distinct museums. The main purpose of a museum is the acquisition, preservation, and study of specimens of scientific value. Public exhibition is a secondary but important function. Materials for exhibition should be limited in amount but selected and displayed to the best possible advantage. The author would like to see the system used at the American Museum of Natural History in New York introduced (in British museums) but thinks it still gives too much space to public exhibition. Part of article and two others under same title (pp. 101-102) by J. Stanley Gardiner and W. M. Tattersall relate more particularly to organization and management.—O. A. Stevens.

96. MANGHAM, SYDNEY. *Method and substance of science teaching: The neglect of biological subjects in education*. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 336. 1920.

97. SNYDER, RAY P. *The school garden as a means of education*. Brooklyn Bot. Gard. Rec. 9: 91-100. July, 1920.

98. VICTORIAN. *Popular Science*. Nature 104: 630. 1920. The author agrees with review entitled Scientific Biography [See: BOWER on HOOKER. Nature 104: 562. 1920.]). He thinks real workers should give some time to popular articles, perhaps one lecture a year which could be published at a popular price.—O. A. Stevens.

99. WENTZ, JOHN B. *An outline of an undergraduate course in grain grading*. Jour. Amer. Soc. Agron. 12: 198-204. 1920.—An outline of the course as presented at Maryland State College. It includes grading of corn, wheat, and oats; laboratory practice; and apparatus used.—F. M. Schertz.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*J. V. HOFMANN, *Assistant Editor*

100. ANONYMOUS. *Allgemeine Bedingungen für die Verpachtung forststaatlicher Jagden in Preussen.* [Leasing of hunting rights on Prussian State Forests.] *Forstwiss. Centralbl.* 42: 100-105. 1920.—In general, hunting is managed by the State forest authorities, but in a few cases is leased to private individuals. The conditions and forms governing such leasing are given.—*W. N. Sparkawh.*

101. ANONYMOUS. *Facts about depletion of our forests.* *Amer. Forest.* 26: 433-435. 1920.

102. ANONYMOUS. *Forestry in France.* *Australian Forest. Jour.* 3: 141-142. 1920.—A description is given of the French method of silvicultural management of a practically normal beech forest of 26,000 acres having a negligible admixture of oak in the State forest in the neighborhood of Lyons-la-Fôret in the Department Eure. The present method of regulation is based on the uniform compartment system with natural regeneration.—*C. F. Korstian.*

103. ANONYMOUS. *Industrial research in forest products.* *Amer. Forest.* 26: 401-407. 7 fig. 1920.—A brief of the work of the Forest Products Laboratory, Madison, Wisconsin.—*Chas. H. Otis.*

104. ANONYMOUS. *Kurze Übersicht über die wichtigsten Kennzeichen der verschiedenen Lärchenarten.* [A brief review of the most important characteristics of the various Larch species.] *Naturwiss. Zeitschr. Forst- u. Landw.* 18: 46-51. 1920.—This brief review contains a key for the cones of the 19 species and varieties in the Larch family, a key for the needles and twigs, and a brief description of each species or variety.—*J. Roesser.*

105. ANONYMOUS. *Progress of the purchase of Eastern national forests.* *Amer. Forest* 26: 454-460. 2 maps, 4 fig. 1920. [From report prepared by the National Forest Reservation Commission.]

106. ANONYMOUS. *The utilization of sand wastes.* *Australian Forest. Jour.* 3: 138-139. 1920.—A brief review is given of the experience of France in the fixation and economic utilization of barren areas of shifting sand in the Landes through the planting of cluster pine (*Pinus pinaster*), and a plea is made for the adoption of similar measures in Australia.—*C. F. Korstian.*

107. ANONYMOUS. *Die Verhandlungen der Preussischen Landesversammlung über den Staatshaushaltsplan der Forstverwaltung.* [Action in the Prussian legislature on the Forest Service budget.] *Forstwiss. Centralbl.* 42: 106-114. 1920.—By the Versailles treaty there was a definite loss to Prussia of 581,513 hectares of forest with an income of 23,459,000 marks, besides a possible loss of 346,862 hectares and income of 24,519,858 marks in the plebiscite areas, and 34,958 hectares and 2,208,000 marks in the districts of Aachen and Trier. Although wood prices have risen along with all other prices, the Forest Service must try to keep them down within reason. It is proposed to cut one-third more wood than usual to supply fuel needs, especially of the bakers; but in many places increased production of fuelwood will have to be made at the expense of construction timber or mine timbers. Receipts from turpentine brought in a considerable revenue, but can be counted on only so long as the industry is needed to supply domestic requirements and is profitable. A demand has arisen for more agricultural land, with the tendency to demand clearing of parts of the State forests. There is also considerable deforestation of private forests, so that a law is under consideration giving the government authority to regulate such clearing and requiring that all forests of more than 15 hectares be subject to State supervision. The question of salaries

and allowances is very pressing, as illustrated by the allowance granted Oberförster for maintenance of teams—3000 marks in 1917 and 6000 marks in 1918, while the actual cost of keeping a team is now 9000 marks per year. In connection with the salary question it was stated that between October 1, 1918, and October 1, 1919, forest vandals killed 13 forest officers and wounded 3 others.—W. N. Sparhawk.

108. ANONYMOUS. *Vorschriften über das Wirtschaftsland (Dienstländereien) der Forstdienststellen in Preussen.* [Regulations regarding farm land connected with Forest Service positions in Prussia.] *Forstwiss. Centralbl.* 42: 69-73. 1920.—Most forest officers are granted a small area of garden, meadow, or pasture, in order to enable them to keep teams, raise at least part of their own food, especially in outlying districts, and also to make them reasonably independent of the local population. They are supposed not to raise anything to sell. Rules are given concerning the granting of such land, its cultivation, fencing, etc.—W. N. Sparhawk.

109. BARBEY, A. *Congrès de la Société forestière de Franche-Comté et Belfort.* *Jour. Forest. Suisse* 71: 50-54. 1920.—The first post-war meeting of this French forestry society was devoted to an examination of the forest of Haguenau, Alsace. Comprising 13,699 hectares, this forest is fifth in rank of French domainial forests and is conjointly owned by the state and by the village of Haguenau. Originally put under systematic management by the French in 1845, it was radically changed during German control (1874-1919) through the application of German systems employing artificial reforestation. Details of German maladministration from the French viewpoint are described. The effort of the French foresters in resuming control will be to bring the forest again under the regime of natural reproduction according to the best traditions of forestry in France.—C. J. Kraebel.

110. BARBEY, A. *Un parasite des pousses du chêne.* [A parasite of oak shoots.] *Jour. Forest. Suisse* 70: 129-131. Sept.-Oct., 1919.—*Stenolechia gemmella* L., also known as *Poecilila nivea* Han.—C. J. Kraebel.

111. BEATH, O. A. *Poisonous Plants.* *Proc. Soc. Promotion Agric. Sci.* 39: 39-47. 1919. See *Bot. Ansts.* 6, Entry 475.

112. BELL, T. R. *Administration report of the forest circles in the Bombay Presidency (including Sind) for 1918-19.* 133 p. Bombay, 1920.—The usual annual report on forest operations in the province. From 66.6 per cent to 94.3 per cent of the total forest areas is open to grazing. The opening of some of the areas closed to grazing, owing to fodder famine, caused considerable damage to coppice growth. During the year the gross revenue increased 17 lakhs (lakh = 100,000 Rs.) over the preceding year and by 30 lakhs over the average of the preceding 5 years. The past year the net revenue equalled 46.3 per cent of the gross revenue. *Caesalpinia brevifolia*, the pods of which contain 50 per cent tannin and having a tannin value superior to Divi-divi (*Caesalpinia coriaria*), has been recommended for experimental cultivation in dry regions. Later it is expected to try this species out on a commercial scale in the successful regions. A private company is planning to test the possibilities of the manufacture of bamboo paper pulp on a commercial basis for a period of 2 years. In timber seasoning experiments good results were obtained by alternate water and air treatment of certain species, and definite recommendations as to methods have been made. On the subject of organization, the following statements are made: "There is no doubt that the divisions existing are too large in extent for management by a single Divisional Forest Officer and their area will have to be reduced in the near future. Regeneration work has never been satisfactory owing to want of staff for supervising—also for execution. And under the new proposed system of clear-cutting about to be introduced in revised working plans, even requirements for silvicultural operations recognized up to the present will be insufficient. Everything, the whole future of the forest, will depend upon adequate, highly trained supervision. For effectiveness, it will have to be European too; the forest life and strenuous, physical exertion entailed make that an absolute *sine qua non* for successful issue. The ordi-

nary, intensively-worked division should certainly not exceed 200 square miles in area, whereas they are now well over 400. The sooner this is recognized, the better." Appended to the report are a number of tables of statistics on forest and administrative subjects.—*E. R. Hodson.*

113. BERNBECK. *Das Wachstum im Winde.* [Growth and wind.] Forstwiss. Centralbl. 42: 27-40, 59-69, 93-100. 1920.—The author discusses the adaptation of vegetation to wind and the effects of wind on vegetation, with especial reference to forest growth. Adaptation is to enable the plant to withstand the physical impact of wind, or to prevent excessive evaporation from the plant tissues, or both. Wind firmness is not an inherent characteristic of any given species, although the tendency toward windfirmness may be inherited; thus a fir grown in the open may be much more wind-firm than an oak grown in a dense stand protected from wind. Under the right conditions any tree can develop a wind-firm form. This fact can be utilized in silvicultural management, so as to minimize loss from windfall. (35,000,000 cubic metres of timber, principally coniferous, was blown down in Germany during the last century.) Wind climate often governs the geographical distribution of trees. For instance, conifers are most liable to injury during the winter months; so sites exposed to continuous winter storms (if fertile enough to allow tall tree growth) are usually occupied by hardwoods, while mountain slopes and plateaus where heavy early summer winds prevail are occupied by conifers. Wind affects the growth and form of trees not only indirectly, by its influence on such site-factors as soil moisture, transpiration, temperature, and exposure of foliage to the light, but also directly, by its physical effect on the plant tissues. Internal stresses and friction between the fibres result in eccentric growth, and also help to stunt the tree by interrupting sap-flow and by affecting cell structure and turgescence. Investigations made at Bonn showed clearly that the stunting effect of wind increases rapidly with wind velocity.—*W. N. Sparhawk.*

114. BERNBERG. *Die Wasserversorgung der Pflanzen im Winde.* [The supply and maintenance of water in plants during wind.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 121-141. 1920.—The physiological action of the mechanical strength of winds in relation to transpiration is manifested in an increase in the amount of moisture given off. The rate of this increase is, in general, governed by the conditions of firmness or stability and inflexibility as opposed to the attacking force of the wind. The following are three ways in which the mechanical action of the wind leads to an increase in water loss: (1) The intercellular gas renews itself in spite of reaction of the stomata, whereby an increase in intercellular transpiration is involved. (2) An excess of pressure in water conducting tissue is occasioned by torsion, pressure, etc. This forces water out of the lumen and membranes of cells subject to the higher pressure into cells under lower pressure, into the intercellular spaces, or through the epidermis into the free atmosphere. This internal pressure in very strong winds can become so great that the cell walls are burst. (3) The water permeability of the outer epidermal wall and the periderm is decreased by deformations.—The quantity of transpiration is strongly influenced by the humidity of the air. Death through excessive water losses and poor conduction reaches its maximum with the lowest relative humidity. Young tender organs are not as unprotected against wind, transpiration, and frost as may be supposed. The younger and the richer the tender-walled cells are in plasma, the more resistant are they to wind pressure. The period of greatest susceptibility is immediately after the period of greatest vegetative activity. The spiral grain in trees much exposed is due to the mechanical action of the wind. The best protection against the mechanical action of wind, as illustrated by the palms and grasses, consists in a flexibility, which allows the plant to bend before the wind.—*J. Roesser.*

115. BURNS, GEORGE P. *Eccentric growth and the formation of redwood in the main stem of conifers.* Vermont Agric. Exp. Sta. Bull. 219. 10 p., 4 pl., 10 fig. 1920.—See Bot. Absts. 7, Entry 318.

116. EBERHARD, JULIUS. *Die Technik der Naturverjüngung einst und jetzt. Eine forstgeschichtliche Studie.* [The technique of natural reproduction formerly and now.] Forstwiss. Centralbl. 42: 161-183, 204-226. 1920.—The author describes the development of silvicultural systems, beginning with the primitive irregular selection cutting. HUNDESHAGEN developed the shelterwood system (Dunkelschlagbetrieb) with preliminary seed cuttings, with later cuttings to give light for the seedlings, and with final removal cuttings after the young growth is well established and able to thrive in the open. Natural reproduction was relied on almost entirely, being considered cheaper and more satisfactory than artificial restocking. After HUNDESHAGEN, silviculturists gradually abandoned the idea of natural restocking, and adopted clear cutting with planting. GAYER and H. MAYER described methods similar to those of HUNDESHAGEN, except that they provided for less frequent but much heavier early fellings, which resulted in less satisfactory reproduction and in more loss from windfall. BORGGREVE's method was more like HUNDESHAGEN's, but delayed the later cuttings longer. GAYER described a group selection cutting (Femelschlagbetrieb) in some respects similar to the shelterwood system, but much less satisfactory. ENGLER advised a combination of group selection and shelterwood, especially for mixed stands containing tolerant and less tolerant species. GAYER also developed a strip shelterwood system, resulting in a stand with regular age-gradations in parallel strips. WAGNER's selection strip or selection border cutting (Blendersaumschlag) provides for reproduction of tolerant species under the stand by making thinnings or selection cuttings, then for clearing strips so that the intolerant species can reproduce. MAYR described a system which he considered applicable to most of the irregular forests of the world, especially those containing many species, including the forests of the tropics. He provided for reproducing a tolerant understory at about the middle of the rotation, followed by occasional thinnings of the overstory to prevent natural losses, and fairly heavy seed cuttings at the end of the rotation, just before or just after the seed falls. The old stand is then to be removed in one or two fellings, within 5 or 6 years. KUBELKA, in his selection-strip system (Femelstreifenbetrieb) gets reproduction by opening holes in alternate strips, and gradually enlarging them. KALITSCH's Bärenthorn system and the author's wedge shelterwood system (formerly called Abruksaumschlag, more recently Schirmkeilschlag) are very similar in providing for very frequent—annual if possible—cuttings through the stand, which do not break the canopy. The last method is particularly distinguished by the form of removal cuttings, which are developed in wedge form, beginning in the middle of the stand, so that logging will not injure established reproduction. In the author's opinion, the present German silvicultural practice (which has also been carried to Russia by foresters trained in German schools) is far behind that at the beginning of the 19th century. The prevailing forest form has changed during the last 200 years from a straight selection forest to extensive pure even-aged forests produced artificially. It is now returning gradually to a modified selection form, very much more intensively cultivated than formerly, with mixed stands and natural reproduction.—W. N. Sparhawk.

117. ENDRES. [Rev. of: REDSLOB, KURT, AND HEINRICH HORNSCHU. *Das neue Thüringen. Heft 5, Aufgaben der Thüringer Forstwirtschaft.* [Problems of Thuringian forestry.] Erfurt, 1919.] Forstwiss. Centralbl. 42: 194-195. 1920.—The new State of Thuringia (Thüringen) comprises the former states: Saxe-Weimar, Saxe-Meiningen, Saxe-Altenburg, Saxe-Gotha, Schwarzburg-Sondershausen, Schwarzburg-Rudolstadt, Reuss (both). It has 403,000 hectares of forest, divided into: crown forest, 13 per cent; state forest, 37 per cent; communal forest, 13.9 per cent; institutional forest, 1.3 per cent; coöperative forest, 4.5 per cent; private forest, 30.3 per cent. It is proposed that large private holdings, under management of technically trained foresters, be subject to state supervision, and that smaller tracts be acquired by the public (state or communes). ENDRES does not believe that this proposal will appeal to the peasants. He considers too optimistic the hopes of the author for great increase of returns through chemical utilization of forest by-products. Noteworthy is the proposed organization of forest research, with about six main branches, all manned exclusively by trained foresters. These are to have parallel units set aside in the field, for prac-

tical trial of the results of research. It is also proposed to establish chairs of forestry at the University of Jena, for training of forest officers, and to found a forest and game museum.—*W. N. Sparhawk.*

118. FABRICIUS, L. [Rev. of: MÜNCH, E. *Naturwissenschaftliche Grundlagen der Kiefernharznutzung*. (Biological basis of resin production from Scotch pine.) Julius Springer: Berlin, 1919.] *Forstwiss. Centralbl.* 42: 157-159. 1920.—The German turpentine industry, which only began in 1915, has in four years developed into an important industry; and the improved methods devised as the result of intensive research have increased production very greatly over the cruder methods formerly used in Austria and even over the French and American methods. Strict application of all that has been learned will result in a yield of resin four times as great as that obtained by the methods used in 1915. MÜNCH's book covers the ground very thoroughly, both from scientific and practical points of view.—*W. N. Sparhawk.*

119. FABRICIUS, L. *Waldbau-Lehrgang im Gebiet des Langenbrander Schirmkeßschlages*. [Silvicultural excursion in the home of the Langenbrand wedge-shelterwood cutting.] *Forstwiss. Centralbl.* 42: 233-237. 1920.—The author describes the silvicultural system used by DR. EBERHARD in the Langenbrand forest (Wurtemberg). This consists of a preparatory stage, in which the stand is prepared for reproduction by repeated moderate thinnings, and a stage of removal cuttings beginning about 5 years after reproduction is established. The preparatory cuttings are intended primarily to get rid of raw humus, which may also be removed by hand either over the whole area or in seed-spots. These cuttings also make room for reproduction, especially of tolerant species, to start. The removal cuttings are rather light, and repeated every year if practicable. They begin in the interior of the stand and progress outward, beginning with small openings, which are gradually enlarged into a wedge shape with the point toward the wind. The shape of opening is not definite, but may be varied to suit local conditions. Damage from storms and logging is reduced to a minimum, and natural reproduction is very successful. Of the whole area, 92 per cent has been reproduced naturally. The principal characteristic which distinguishes this from certain other methods is the shape and arrangement of the cuttings so as to eliminate damage from logging and from winds.—*W. N. Sparhawk.*

120. FARRINGTON, H. A. *Annual progress report on forest administration in the presidency of Bengal for 1918-19*. 51 p. Calcutta, 1920.—The usual annual report dealing with forest operations in the province. It is reported that 16 per cent of the reserved forests and 3 per cent of the protected forests were open to grazing, and that the entire area of the unclassified forest is always open for this purpose. Unrestricted grazing and lack of fire protection caused the Muli bamboo to fail in re-establishing itself properly after seeding. Wherever cattle have access (practically on all areas within a mile of the forest boundary) seedling regeneration of most kinds of trees is destroyed. It is necessary to fence planted areas to protect them from damage by cattle grazing. In the unfenced hills natural regeneration is entirely destroyed by cattle. Above 5,500 feet in altitude natural reproduction in coppice fellings is not successful and must be supplemented by planting. At lower elevations the coppice system produces excellent results. Burned areas in coppice cuttings give success with a large number of species, including seedlings of Mallata, Toon, and other species. Experiments were undertaken with growing blue gum (*Eucalyptus globulus*) for fuel purposes. At the close of the year there were 50 forest villages, totaling an area of 7508 acres. The surplus at the close of the year was 1,121,760 Rs. Twenty-one form tables and a map of the province are appended. In chapter seven is given a review of forest administration in Bengal for the preceding 5-year period.—*E. R. Hodson.*

121. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. [Restrictive legislation and notices of quarantines in U. S. A.] *Service and Regulatory Announcements* 68: 52-111. 1920.

122. GARR, H. D., AND GEORGE E. EWE. Hemlock bark (*Tsuga canadensis*) for pharmaceutical purposes. Jour. Amer. Pharm. Assoc. 9: 567-573. 3 fig. 1920.—See Bot. Absts. 6, Entry 819.

123. GINZBERGER, A. Zwei neue Standorte der gefeldert-rindigen Buche, *Fagus silvatica* var. *quercoides* Pers., in Mittel Italien und Slavonien. [Two new site-localities of the grooved-barked beech, *Fagus silvatica*, var. *quercoides* Pers., in central Italy and in Slavonia.] Naturwiss. Zei sehr. Forst-u. Landw. 18: 39-41. 1920.

124. HAY, R. DALRYMPLE. Progress of forestry under independent management in New South Wales. Australian Forest. Jour. 3: 151-156. 1920.—A record of established progress in forest management by the Forestry Commission of New South Wales following a needed reform is given under these topics: classification, demarkation and organization, fire protection, utilization and regeneration of hardwood forests, publicity work, forest grazing, forestry statistics, forestry education, coniferous plantations, research, and forest revenue.—C. F. Korstian.

125. HENRY, AUGUSTINE. The afforestation of water catchment areas. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 337. 1920.

126. HIRST, E. C. State forest fire protection. Amer. Forest. 26: 408-409. 1920.

127. HODSON, E. R. Some present day problems in forestry. Utah Acad. Sci. 1: 45-54. 1918.—Paper presented to the Academy in April, 1911.

128. HOHENADL, W. Die Hebung der Alpwirtschaft. [Promotion of the alpine dairy business.] Forstwiss. Centralbl. 42: 41-59. 1920.—The author contrasts the development of the dairy industry in Allgau with that in Upper Bavaria. The difference is to a considerable extent traceable to the difference in character of ownership of the mountain pastures as well as of the mountain forests. This industry is in very close contact with the forest industry, and foresters are especially favorably situated for taking the lead in promoting better methods and more conservative, and at the same time, more intensive utilization.—W. N. Sparhawk.

129. HUTCHINS, D. E. Insignis-pine disease. Jour. Agric. New Zealand 16: 37. 1918.—See Bot. Absts. 5, Entry 1273.

130. JUDD, C. S. The kauri pine. Hawaiian Forester and Agric. 17: 167-169. Pl. 1. 1920.—This is reported as being the most promising and widely useful tree for planting in the Hawaiian Islands for the purpose of producing lumber. This species, *Agathis australis* shows a rapid growth in the Islands, "averaging a growth of 1 inch in diameter every $4\frac{3}{4}$ years." It was introduced into Hawaii about forty years ago.—Stanley Coulter.

131. KORSTIAN, C. F. Value of scientific research in forestry. Utah Acad. Sci. 1: 186-194. 1918.

132. LEININGEN-WESTERBURG, (GRAF ZU). Rauchschäden und einschlagige bodenkundliche Fragen. [Smoke injury and related matters of soil science.] Forstwiss. Centralbl. 42: 18-93. 1920.—See Bot. Absts. 7, Entry 459.

133. MACKAY, H. Forestry in Victoria. Australian Forest. Jour. 3: 147-150, 179-182. 1920.—The second and third installments of a continued article. The silviculture of eucalyptus forest is briefly treated. The following methods of cutting are advocated as the simplest and best forms of management for adaptation in Australia: (1) clear cutting; (2) modified selection; (3) for young forest, coppice with standards, or a modification of the shelterwood compartment system; (4) simple coppice, or the clear cutting of pole timber. A rotation of 20 to 30 years for a box and ironbark forest will produce pole timber from 6 to 9 inches in diameter, with some 12-inch timber. The progress made in plantation work and in gifts of trees for shelterbelts to small settlers is noted.—C. F. Korstian.

134. MAXWELL, HU. The uses of wood. Wood for musical instruments. Amer. Forest. 26: 532-539. 16 fig. 1920.
135. MOREILLON, M. Dommages causés aux forêts du canton de Vaud par le foehn des 4 et 5 janvier 1919. [Damage to the forests of Vaud (Switzerland) by the foehn of January 4 and 5, 1919.] Jour. Forest. Suisse 71: 41-44. 1920.—A brief presentation of reasons why this wind should have caused local wind-throw although the foehns of other years have never been known to do so.—C. J. Kraebel.
136. MOREILLON, M. Influence de l'ombrage sur la valeur des gazons dans les pâturages boisés. [The influence of shade upon the value of grasses in wooded pastures.] Jour. Forest. Suisse 70: 131-142. 1919.—See Bot. Absts. 7, Entry 39.
137. NIKLAS, H. Die Bedeutung der Geologie für die Land- und Forstwirtschaftliche Bodenkunde. [The significance of the science of geology with relation to agricultural and forest soil science.] Naturwiss. Zeitschr. Forst-u. Landw. 18: 22-35. 1920.—See Bot. Absts. 7, Entry 478.
138. NIKLAS, H. Übersicht über Bayens Bodenverhältnisse. [Summary of Bavarian soil conditions.] Forstwiss. Centralbl. 42: 123-135. 1920.—See Bot. Absts. 7, Entry 461.
139. PACK, CHAS. L. Fire protection and more public forest land. Amer. Forest. 26: 526-528. 1920.
140. PIETSCH, ALBERT. Wie erklärt sich das lange Hängenbleiben der Blätter an einigen phanerogamen Holzgewächsen im Herbst 1919? [What is the explanation for the late retention of the foliage of several phanerogamous woody plants in the fall of 1919?] Naturwiss. Zeitschr. Forst-u. Landw. 18: 150-155. 1920.—A combination of adverse conditions—a late spring, a cool summer, a wet October, and an early November frost—was responsible for the rather extraordinary retention of the foliage in the pear (*Pirus communis*), red thorn (*Crataegus monogyna*), the garden rose, blackberry (*Rubus caesius*), and peach (*Prunus persica*) in the fall of 1919. The explanation lies in the meteorological conditions through the year.—J. Roescr.
141. PRANTNER, E. F. The forests of a new republic. Amer. Forest. 26: 522-525. 9 fig., 1 map. 1920.—A brief discussion of forest conditions in Czechoslovakia.—Chas. H. Otis.
142. RECKNAGEL, A. B. New York's forests and their future. Amer. Forest. 26: 518-521. 4 fig., 1 table. 1920.
143. ROTH, FILIBERT. Another word on "light burning." Amer. Forest. 26: 548, 572. 1920.
144. RUBNER, K. Forstliche Standortsgewächse im westlichen Moränengebiet Bayerns. [Vegetation as forest site indicators in Bavaria.] Forstwiss. Centralbl. 42: 135-144. 1920.—The author discusses CAJANDER's theory that forest sites can be classed into a very few types based on key plants, such as *Oxalis*, *Vaccinium myrtillus*, and *Calluna*, regardless of elevation, soil conditions, latitude, or other factors, and that the growth of the same species within one type wherever located is about the same, but is very different in different types. RUBNER does not believe that such general classification, even with the subtypes CAJANDER proposed, can be made to apply to a large region, but believes that each locality will have certain plants that indicate the character of the different sites, which may or may not be common to other localities. He illustrates this by discussing the vegetation under the forests in the districts of Betzigau, Ottobeuren, Sachsenried, and Denklingen, which is the optimum spruce region in Bavaria and possibly in all Germany, with yields far above the average for Quality I sites. Indicator plants show particularly the humus conditions; i.e., whether the soils are mild, with normal decomposition of humus, or whether they are becoming acid with raw humus.

Such plants may be *guide-plants*, practically always found on a particular kind of soil; *accessory indicators*, frequently present but often missing; and *regional indicators*, found only in certain regions. Plants indicative of mild soils are *Oxalis acetosella*, *Asperula odorata*, *Impatiens noli-me-tangere*, *Galium rotundifolium*, *Elymus europaeus*, *Milium effusum*, *Brachypodium silvaticum*, *Carex silvatica*, *Catharina undulata*, *Mnium undulatum*, *Hypnum* spp. Indicators of beginning or continuing raw humus formation are: *Vaccinium myrtillus*, *Festuca silvatica*, *Lycopodium annotinum*, *Polytrichum formosum*, *Dicranum scoparium*. This matter deserves much more attention from forest investigators, since it has a very direct bearing upon silvicultural practice, especially in connection with natural reproduction and with methods of thinning.—W. N. Sparhawk.

145. RUBNER, K. *Holzpreise in Süddeutschland in früherer Zeit*. [Wood prices in South Germany in former times.] Forstwiss. Centralbl. 42: 226-233. 1920.—The author discusses prices of wood (chiefly firewood) in various localities, going as far back as 1630 in some instances. Especially noteworthy is a rapid increase in prices about the middle of the nineteenth century, which was attributed by some to increased population, rise of wood-using industries, and decreased wood production, and by others to an era of speculation. Just as relief came then through the development of railroads and the rise of a world trade in wood, so can relief from present abnormal wood prices, which are also due to a considerable degree to speculation coupled with inadequate supplies, come only with the resumption of imports from Russia or other exporting countries.—W. N. Sparhawk.

146. SCHEIDTER, FRANZ. *Schlagruhe und Rüsselkäfer*. [Suspension of cuttings and weevil damage.] Forstwiss. Centralbl. 42: 144-150. 1920.—The author discusses the life history of the weevil, and shows that it can not be eliminated from a forest by temporarily suspending cuttings, as has been proposed. Contrary to general belief, the beetle flies for long distances during the mating period, and may attack newly planted trees far away from any cutting area. Suggested control measures include cleaning up cuttings, with grubbing out of stumps as soon as possible after logging; smearing of individual trees, where practicable, with bands of glue or tar; and the construction of traps by blazing fresh stumps just above the ground and covering the blazes with loose bark, from beneath which the beetles can be scooped up daily or more often.—W. N. Sparhawk.

147. SCHMAUSS, A. *Über Sturmgefährdungen*. [Concerning storm damage.] Forstwiss. Centralbl. 42: 189-194. 1920.—Prevailing winds in central Europe being from the southwest or west, trees are ordinarily adapted to resist winds from those directions, and are likely to be wind-thrown only by winds from other quarters. Storms from the east or northeast would be most destructive, but they are exceedingly rare. Those from the southwest—of which the föhn winds are most common—are seldom strong enough to do great damage, so that only the fairly strong winds—20 meters per second and over—from the northwest need be considered in forest management. The origin and behavior of these winds is discussed in some detail. It is concluded that the best direction for succession of cuttings is from northeast to southwest, since this will favor reproduction and at the same time will allow a minimum of damage from northwest winds.—W. N. Sparhawk.

148. SCHREINER. *Blitzschaden an einer liegenden Eiche*. [The work of lightning on a fallen oak.] Naturwiss. Zeitschr. Forst-u. Landw. 18: 42-43. 1920.—The author records a phenomenon which he has not encountered in any of his previous practice. The oak stem in question was 7.4 meters long and 0.46 m. in diameter, D I B. The tree had died and fallen and the rotten butt had been removed, while the remaining section on the ground was sound. One-half of the stem was free of limbs. The woody fibers were straight; no twisted grain was in evidence. The stem lay in the midst of a thin stand of beech about 30 meters high. Lightning struck directly on the fallen stem, and ran the full length of it, making a three quarters revolution. Since it could not have followed the grain, it is thought the curvature of the stroke was due to the attraction from the damp portion of the stem lying against the soil. The soil is derived from sandstone.—J. Roeser.

149. S(CHÜPPER). *Englands Waldpolitik vor und nach dem Kriege.* [England's forest policy before and after the war.] [Chiefly a discussion of an article by Ivar Trägårdh in *Svenska Dagbladet*, 1919, No. 344.] *Forstwiss. Centralbl.* 42: 150-156. 1920.—England's power depends on her fleet, which requires coal; the latter cannot be obtained without a supply of mine timbers. These had hitherto been obtained cheaply from France and Scandinavia, but just prior to the war increasing prices had made people begin to think of the home forests, which were mostly hardwoods except for small areas of conifers in Scotland. Early in the eighteenth century it had been decided to plant 100,000 acres with oak for ship timbers, and by 1823 half of this area was planted. Then the coming of steel ships put an end to this project. With the outbreak of the World War, there was great difficulty in getting sufficient timber; half of England's forests were cut down, and the rest would have been cut down if the material could have been got out easily. Of the monthly consumption of 100,000 tons of mine timber, England supplied 40,000 tons and France the rest. From 1916 to 1918 about 17,000,000 tons of timber were cut, or more than 20 years' normal cut. The report of the Forestry Subcommittee of the Ministry of Reconstruction is outlined. The measures recommended were adopted in the law of September 1, 1919, which created a Forest Commission with broad powers and an appropriation of £3,500,000. The reviewer suggests that estimates of costs and of returns may be somewhat optimistic, and that allowance was not made for a possible future drop in prices as home production increases, but points out that there are other advantages, such as insuring an emergency supply as well as making productive large areas of waste land, whose value cannot be estimated.—W. N. Sparhawk.

150. SCHUSTER, MATTHÄUS. *Die wirtschaftliche Hegung und Ausnützung der bayerischen Hohen Rhön.* [The economic development and use of the Bavarian High Rhön.] *Naturwiss. Zeitschr. Forst-u. Landw.* 18: 1-10. 1920.—The Bavarian High Rhön Mt. region is noted for its large areas of unused meadowland, which because of soil and location are unfit for agricultural use. During the war, and for a considerable time previous, this territory had been practically neglected. It is known that as late as the end of the eighteenth century, the region was one of considerable economic importance; this was due chiefly to the efforts of the abbots of Fulda, who developed the limited mineral resources and the numerous springs around Brückenau, and also made use of the large, uncultivated meadows in the mountains as pastures for horses and cattle. At present, the whole region is dead and awaits a resurrection. Its agricultural value is low; it has no great advantage over other areas in its mineral resources. The extensive mountain meadows, however, can and must be utilized for cattle grazing, in order to assist in the economic restoration of industrial Germany.—J. Roesser.

151. TAYLOR, T. W. *Kurrajong as a fodder tree.* *Australian Forest. Jour.* 3: 186-188. 1920.—The cultivation of kurrajong (*Sterculia diversifolia*) for fodder purposes is advocated. This species is one of the best fodder trees as a stand-by in times of drought, as well as a tree that is very ornamental and useful for shade purposes on the open plains.—C. F. Korstian.

152. TUBEUF, KARL FREIHERR VON. *Über die Zweckmässigkeit der Zusammenlegung Kleinpärzellierten Waldbesitzes.* [Concerning the necessity of consolidating small parcelled-off forest holdings.] *Naturwiss. Zeitschr. Forst-u. Landw.* 18: 155-162. *Fig. 1-3.* 1920.—The author describes three examples of forest areas, subdivided into small holdings with distinct division lines, which he found on the foothills of the Alps; namely, at Füssen, at Kohlgrub, and at Brannenbourg. In the case of the first two, where long strips of forest, each privately owned, are separated by strips of meadowland; the forest is injurious to the growth of grass in the meadows; the open meadows leave the forest open to severe damage by windfall, etc.; and there is no system or definite plan of utilization of the forest product. In the last-mentioned case, a steep mountain side of approximately 155 ha is parcelled into 60 separate holdings, these being in narrow strips parallel to the slope and separated by wide lanes, 10-30 meters wide. Some of the strips themselves are but 8 meters wide. The consolidation of the holdings on the tract under one management will mean uniform management and harvesting

of product and closer utilization of the soil, since all of the lanes but one will be allowed to regenerate. The revenue derived would be pro-rated according to the area held by each member of the association or ownership, and the yield would be increased five or six times. Statistics show that the average yield from small holdings is 2 cubic meters of wood per year per ha, while on state forests, it amounts to 4-6 cubic meters. In North Germany, the formation of forest associations by direct state aid is desirable to secure reforestation on the large plains; in South Germany it is desirable in order to prevent the damage resulting from parcelling of woodlands into small tracts; and in the mountains in order to introduce uniform and efficient methods of logging. The demands of the time call for utmost utilization of the soil.—*J. Roesser.*

153. WILBRAND. **Eichenhochwald.** [Oak high forest.] Forstwiss. Centralbl. 42: 183-189. 1920.—Oak is one of the most valuable and necessary woods, and is in great demand, especially in large sizes. It should always be grown to produce large-sized material, and the smaller sizes wanted can be obtained as by-products, from thinnings. For short rotations spruce, pine, and beech are more profitable. Oak grows slowly, and needs plenty of light. It should always be grown in pure stand (during the first part of the rotation); and best results follow clear cutting of small areas, with planting, and cultivation of garden crops for two years between the rows. After the stems have made their height-growth and the crowns have begun to form, thinnings should commence, and should follow every 4 or 5 years, so as to keep the crowns of the reserves always free and prevent dying off of even the lower branches. This will prevent dead knots. Beech can be under-planted when the boles have reached their full height, after the crowns have started to spread. This method will result in the maximum possible clear bole, in regularly spaced annual rings, which is an advantage for many purposes, and in reasonably fast growth.—*W. N. Sparhawk.*

154. ZELLER, S. M. **Humidity in relation to moisture imbibition by wood and to spore germination on wood.** Ann. Missouri Bot. Gard. 7: 51-74. Pl. 1, 5 fig. 1920.—See Bot. Absts. 7, Entry 400.

155. ZIMMER, W. J. **The need of softwood introduction.** Australian Forest. Jour. 3: 184-185. 1920.—A brief discussion of the demand for softwoods, and an argument for more extensive planting of pines. In a list of trees reported to be growing in the State Nursery at Macedon, Victoria, many of which measure up to 108 feet in height and a stem girth of more than 9 feet, ten North American conifers are noted.—*C. F. Korstian.*

156. ZON, RAPHAEL. **Forests and human progress.** Geog. Rev. 10: 139-166. 1920.—The author recognizes three stages in the development of man's relation to the earth's forested areas from prehistoric times until the present. These stages are designated: (1) *Civilization dominated by forests*, (2) *civilization overcoming the forests*, and (3) *civilization dominating forests*. While forming a natural sequence, it is pointed out that the stages made unequal progress in different parts of the earth. For illustration, Central Africa and South America are now in the first stage; a considerable part of North America and Asia are in the second; but in Europe and parts of the United States the third stage is reached. The first stage deals with prehistoric and early historic man. It is traced through indirect means, as the migration of races, the configuration of ancient forests, and from folk lore, myth, and the vestiges of primitive religions. The second stage denotes man's progress in the production and use of tools of an advanced and efficient type, and shows an increasing pressure for tillable land. This stage lies for the most part within the historic period, although place names in certain parts of Europe are excellent indirect evidence of the progress of early clearings and forest settlements. The third stage shows civilization triumphant over its ancient enemy, and brings the story down to modern times. It deals with current movements and the immediate past.—*E. R. Hodson.*

GENETICS

G. H. SHULL, *Editor*J. P. KELLY, *Assistant Editor*

157. ANONYMOUS. [Rev. of: (1) HARRISON, J. W. HESLOP. A preliminary study of the effects of administering ethyl alcohol to the lepidopterous insect, *Selenia bilunaria*, with particular reference to the offspring. Jour. Genetics 9: 39-52. Dec., 1919. (2) DUERDEN, J. E. Methods of degeneration in the ostrich. Jour. Genetics 9: 131-193. Pl. 5-6, 8 fig. Jan., 1920.] Nature 104: 609. 1920.

158. ANONYMOUS. Vägledning på försöksfälten 1920 vid Svalöf och filialerna. [Guide to the experimental fields of Svalöf and its branch experimental stations, for the year 1920.] 1.45 × 200 mm., 52 p., 1 map. Landskrona, 1920.—Pamphlet intended as a manual for visitors. During this year 14,059 plots (of which 94 are mass-cultures) have been laid out.—K. V. Ossian Dahlgren.

159. BACH, SIEGFRIED. Zweierlei Weisslinge bei Mais. [Two kinds of albinos in maize.] Zeitschr. Pflanzenzücht. 7: 238-241. June, 1920.—From open-pollinated ears of maize, the author reports the occurrence of two types of albinistic seedlings. One ear produced 170 green and 4 pure white seedlings, the latter dying within a month's time. The other ear produced 160 green and 5 partially green (striped) plants which died in two months. The low proportion of albinistic seedlings is due to random open-pollination with a small amount of natural self-pollination. Author assumes that chlorophyll content in maize is dependent upon at least two pairs of factors, XX and YY ; and that the parent ears noted above had the genotypic formulae $XXYy$ and $XyYY$ respectively.—E. W. Lindstrom.

160. BAUMANN, E. Beiträge zur Kenntnis der Rapspflanze und zur Züchtung des Rapses. [Contributions to a knowledge of the rape plant and to the breeding of rape.] Zeitschr. Pflanzenzücht. 6: 139-184. 2 figs. Dec., 1918.—A program for improving the rape plant was followed through a period of nine seasons (1909-1917), together with a study of the inheritance of certain characters influencing the performance of the plant under a variety of weather conditions. Of the qualities concerned in making for a larger gross yield, and greater desirability of product, the adaptation of different varieties to climate, particularly with reference to the time of resumption of growth in spring and the latest occurrence of spring frost, was found to be of much practical importance. Of primary interest, also, were found the capacity of varieties to resist insect attack, and to occupy gaps in the stand by the development of branches. A detailed study of external morphology showed that the taller the plant, the greater was the number of internodes, and the higher the insertion of the latter on the axis. The increase in length of lateral branches of the first order from tip toward base begins as a straight line function, but toward the end is lessened considerably. A similar relation obtains in the case of branches of the first and higher orders. Generally, in plants having a long axial stem, the primary and secondary branches are shorter, and the inflorescence more crowded. Plants of the higher continuity states, possess in a larger measure the qualities making for increased productivity, as the different morphological elements tending toward greater yield are more numerous and better differentiated. Adaptation to a particular climate is largely contingent on the capacity to form a vigorous healthy growth in fall, and to develop shoots rapidly in spring, through which damage by late frosts and insects is resisted. An excessively vigorous growth, on the other hand, may bring about a spindling condition, encourage decay, and render the crop more subject to late spring frosts. In all cases, varieties and races requiring the longer periods for maturing gave the greater yields. The performance of species or genera making for adaptability to climate is an expression of the irritability of its cells to thermal stimuli. The importance of physiological data derived from breeding experiments to the ecology and the distribution of plants is emphasized.—Charles Drechsler.

161. BECKER, J. Beiträge zur Züchtung der Kohlgewächse. [Contribution to the breeding of the Brassicas.] Zeitschr. Pflanzenzücht. 7: 91-99. Dec., 1919.—Discusses the necessity of seed selection. Outlines a method whereby the four best plants are selected from a good variety. These four plants are over-wintered and planted together the following year. Pods from each plant are harvested separately, and each pod is handled as a unit. Seeds of each are sown the following spring, and each individual seedling is grown in a pot and transplanted to the field. Undesirable lines and plants are eliminated after taking careful data on plant characters, production, and food value. The ten best plants are selected, and the following year the four best are again grown in an isolation plot. A second selection of plants is made in the fall and carefully over-wintered. These produce seed for the main crop. A single *Brassica* plant produces 2100 to 15,000 seeds—sometimes as high as 36,000.—The writer favors the use of plants for seed production which themselves have produced well-developed heads. States that different sorts should be 400 to 500 meters apart in the field to prevent cross-pollination.—H. K. Hayes.

162. BECKER, J. Serologische Untersuchungen auf dem Gebiete von Pflanzenbau und Pflanzenzücht. [Serological investigations in the realms of plant culture and plant breeding.] Landwirtsch. Jahrb. 53: 245-276. 1919.—By the use of serums prepared by injecting plant extracts into animals it is possible to distinguish between seeds which are so nearly alike that by examination it is difficult to classify them; for example, seeds of *Brassica napus* and *B. rapa*. It is also believed that it will be possible to determine genetical differences, by this means, where no morphological differences can be made out, in closely related individuals.—D. F. Jones.

163. BLAKESLEE, A. F. Unlike reaction of different individuals to fragrance in *Verbena* flowers. Science 48: 298-299. Sept. 20, 1918.—On the basis of susceptibility to the fragrance of two varieties of *Verbena*, A and B, 48 persons could be classified into two groups. The one group, of 32 persons, was susceptible to fragrance in variety A but not to any in B; for the other group of 16 persons the reverse was true.—Edgar Altenburg.

164. BLARINGHEM, L. Couleur et sexe des fleurs. [Color and sex of flowers.] Compt. Rend. Soc. Biol. 83: 892-893. June, 1920.—Many horticultural varieties of Sweet William, *Dianthus barbatus*, are hybrids, and sometimes show hybrid origin by a mosaic splitting, which appears only on a few shoots and only on old plants. One remarkable plant showed, during two seasons, color changes in the petals which ran parallel with the sexual development of each flower. *D. barbatus* is hermaphroditic and protandrous. During 5-8 days while anthers are shedding petals are white. Within subsequent 24-48 hours stigmas become functional, and petals turn bright red. This abrupt change should furnish a convenient index in a study of the inheritance of those physiological conditions which are associated with the sexes.—Merle C. Coulter.

165. BLARINGHEM, L. Hérité et nature de la pélorie de *Digitalis purpurea* L. [Heredity and nature of the peloria of *Digitalis purpurea* L.] Compt. Rend. Acad. Sci. 171: 252-254. July, 1920.

166. BLARINGHEM, L. Variations de la sexualité chez les composées. [Variations in sexuality in the Compositae.] Compt. Rend. Soc. Biol. 83: 1060-1062. July, 1920.—Author recalls supposition of HILDEBRAND and VAN UEXKULL-GYLLENBAND to effect that common composites are in state of evolution away from hermaphroditism. This opinion was based on existence of florets in intermediate conditions. Author says his observations on *Centaureas* of *jacea* group do not support such an hypothesis. Plants from four stations gave evidences of having resulted from hybridization of *C. jacea* and *C. nigra*. In the sterile (peripheral) flowers there was pollen sterility and variation in degree of ciliation of a certain part of the achene; and there were appendages, such as free stamens or deformed styles.—J. P. Kelly.

167. BOWER, F. O., J. GRAHAM KERR, AND W. E. AGAR. **Lectures on sex and heredity delivered in Glasgow, 1917-1918.** 16mo vi+119 p., 49 fig. Macmillan Co.: London, 1919.—Distinctly popular; profusely illustrated. Introduction: Terms defined (prefers "syngamy" to fertilization); nature and function of sex discussed; its features contrasted with asexual reproduction. (1) Origin of sex in plants: Origin and differentiation of sex illustrated by *Ulothrix*, *Ectocarpus* spp., *Fucus* spp.; likens primitive isogamous plants to plant proletariat, producing numerous offspring with little physiological capital, so that each individual when produced must depend chiefly on its own efforts. Heterogamous forms, with well-nourished eggs, are capitalists whose progeny start life with an inheritance. Parallel evolution in several lines indicates that advantage is with latter; sex process in fern and angiosperm is described. (2) Effect of fixed position on sexuality of plants: detailed discussion of fertilization mechanism in ferns, pollination and pollen-tube growth in angiosperms; advantages of "nursing habit" in latter for their embryos. (3) Reproductive process in animals: some general principles; differentiation of sex illustrated by *Copromonas*, *Stylorhynchus*, *Plasmodium*; in *Copromonas*, discusses auto-intoxication which comes after generations of a sexual reproduction, and how unfavorable conditions favor the sex act; sketches embryology in higher animals, early differentiation of gonads, continuity of germ-plasm, inheritance of acquired characters. (4) Modifications of reproductive process as adaptations to life on land: adaptations by various frogs and toads, representing "attempts to get rid of the free aquatic existence during the early stages of the life-history;" gross embryology of chick; monotremes, marsupials, higher mammals; transplantation of ovaries; transmission of disease from mother to offspring. (5) Heredity: Physical basis of heredity, using *Cyclops* as example; DARWIN's pangenesis, GALTON's and WEISMANN's views; isolation of germ-plasm in *Cyclops*; inheritance of acquired characters; MENDEL's law, with Andalusian fowl as example; dominance illustrated by red X white *Antirrhinum* [?]. (6) Heredity in man: Mendelian inheritance of brachydactyly; GALTON and PEARSON laws applied to inheritance of stature, insanity, special ability, assertiveness, popularity; dangers from multiplication of unfit, and differential birth-rates favoring non-intellectuals.—*Merle C. Coulter*.

168. BREAKWELL, E. **Improvement of sweet sorghums.** Agric. Gaz. New South Wales 31: 549-551. 1920.—Summary of methods for securing improved strains.—*L. R. Waldron*.

169. BRIERLY, W. G. **Report of the division of horticulture.** Minnesota Sta. Rept. 1919: 49-54. 1919.—Outlines the work on inheritance of fruit characters, on sterility in fruits, on breeding for hardiness, and on breeding and selection of vegetables.—*H. K. Hayes*.

170. BURNS, W. **Some aspects of plant genetics.** Agric. Jour. India 15: 250-281. 1920.

171. CARROLL, MITCHEL. **An extra dyad and an extra tetrad in the spermatogenesis of *Camnula pellucida* (Orthoptera); numerical variations in the chromosome complex within the individual.** Jour. Morph. 34: 375-455. 14 pl. Sept. 20, 1920.—Ten specimens of *Camnula pellucida*, an orthopteran of the family Acrididae, were used in this investigation. Of these, five were seemingly unique in their cytological phenomena. Conjugation during maturation of a homologous pair of supernumerary chromosomes and the occurrence of "indisputable instances" of definite numerical variations within the individual in germinal chromosome complexes in non-pathological tissue are the main things considered in the paper.—The normal constituents of the complex are constant in number, and the aberrant condition is due to the presence of a varying number of supernumeraries in different cells within an individual. This variation is not constant for the gonad, but is constant for the cyst, and probably constant for the follicle until after the first spermatocyte mitosis.—The supernumeraries are all homologous in size, form, and behavior, and are apparently genetically related. Within one individual the extra element may be absent in some complexes, unpaired in some, paired in others, and present in triplicate in still others. If unpaired, it divides in only one division, usually the second. It is a matter of chance as to whether or not it goes with the accessory chromosomes. If the supernumerary is paired it behaves as any ordinary chromosome. If present in triplicate, two of the elements synapse and behave

like an ordinary chromosome, while the other behaves in the manner described for the unpaired condition. Three cases of nondisjunction were observed. In two instances *t* was a matter of the non-disjunction of the dyads of the supernumerary tetrad in the first maturation division. The third is a "case of either maturational equational non-disjunction or a peculiar type of reductional non-disjunction of the chromatids of the extra tetrad."—The occurrence and behavior of the supernumeraries without non-disjunction make it possible to have six kinds of spermatozoa; and should non-disjunction take place, two extra classes are possible. Since non-disjunction occurs, it must duplicate a whole or a part of one of the elements of a normal complex. It is obvious that the behavior of the supernumeraries must influence the Mendelian ratios in any system of allelomorphs which may be carried by them, since certain loci may exist in a double, treble, quadruple, or quintuple condition. These various valences may be present in different germ cells of the same individual.—*Mary T. Harman.*

172. CASTLE, W. E. Whitman and Riddle on orthogenetic evolution in pigeons. *Amer. Nat.* 54: 188-192. Mar.-Apr., 1920.—A critical but appreciative review of this monumental work. Whitman believed his experiments to prove that Mendelism was relatively limited in its application, but CASTLE shows that the results may be interpreted in conformity with present Mendelian theory.—*L. J. Cole.*

173. CORRENS, C. Pathologie und Vererbung bei Pflanzen und einige Schlüsse daraus für die vergleichende Pathologie. [Pathology and inheritance in plants and a conclusion derived therefrom for comparative pathology.] *Mediz. Klinik.* 16: 354-359. April, 1920.

174. CORRENS, C. Eine geglückte Verschiebung des Geschlechtsverhältnisses. Botanische Versuche zur Frage nach der Entstehung des Geschlechts. [A successful modification of the sex-ratio. Botanical researches on the question of the origin of sex.] *Natur u. Technik* 2: 65-71. 2 fig. 1920.

175. COULTER, M. C. [Rev. of: CASTLE, W. E. Piebald rats and the theory of genes. *Proc. Nation. Acad. Sci. [U. S.]* 5: 126-130. 1 fig. April, 1919.] [See *Bot. Absts.* 3, Entry 235.] *Bot. Gaz.* 70: 326. Oct., 1920.

176. CROZIER, W. J. The intensity of assortive pairing in *Chromodoris*. *Amer. Nat.* 54: 182-184. 2 fig. 1920.—This article is an additional note concerning a report published by CROZIER in *Journal of Experimental Zoology* in 1918 [See *Bot. Absts.* 1, Entry 1472] in which he shows that in the pairing of *Chromodoris* there is a "considerable degree of assortive conjugation with respect to size." In that report regression lines showing mean lengths of mates pairing with individuals of a given length class were based on "artificial" measurements; that is, the soft bodies were somewhat flattened and accordingly lengthened by the process by which they were measured. In this report the relationship between the "artificial" and normal measurements of 74 individuals is established, and the regression plots are revised in terms of the normal lengths. "The apparent intensity of homogamy in *Chromodoris* is but little affected, if anything perhaps slightly improved, by the reduction of the original figures to the natural scale."—*Sylvia L. Parker.*

177. DAVENPORT, C. B. Heredity of twin births. *Proc. Soc. Exp. Biol. Med.* 17: 75-77. 1920.—The incidence of twin births in the general population is about 1 per cent, but in certain families it rises to as high as 15 per cent, indicating that the tendency to twin production is an hereditary trait. Only biovular twinning is considered in the present communication, and only such matings are selected for analysis as have produced at least two pairs of twins. In such cases the immediate relatives—parents, brothers, and sisters,—are found to produce twins from four to eight times as frequently as does the population at large. This is about equally true for relatives on the father's side and on the mother's side, which shows that the male exerts an influence on biovular twin production commensurate with that of the female. In explanation of the nature of this influence of the male, it is pointed out that

while there is evidence that double ovulation is relatively common, the probability that viable twins will be produced is dependent upon the chance that both ova will be fertilized and that both will be free from lethal factors. These prerequisites are dependent as much upon the sperm as upon the egg and it is known that fecundity and the presence or absence of lethal factors are hereditary traits.—*C. H. Danforth.*

178. DAVIS, BRADLEY M. [REV. OF GAGER, C. STUART. **Heredity and evolution in plants.** 14 × 20 cm., xi + 265 p., 113 fig. P. Blakiston's Son & Co.: Philadelphia, 1920.] *Science* 52: 410. Oct. 29, 1920. [See Bot. Absts. 6, Entry 1672.]

179. DEMBOWSKI, JAN. **Das Kontinuitätsprinzip und seine Bedeutung in der Biologie.** [The principle of continuity and its significance in biology.] Vortr. u. Aufsätze ü. Entwicklungsmech. Org. 21. 132 p. 1919.

180. DEXTER, JOHN S. **Albino vertebrates.** *Science* 52: 130-131. Aug. 6, 1920.—The author makes note of a pure albino grackle (*Quiscalus quiscula aeneus*), two albino specimens of Richardson's spermophile (*Citellus richardsoni*), and a very light brown albinistic crow.—*Sewall Wright.*

181. [DIENER, RICHARD.] **The law of hybridizing discovered by Richard Diener.** 20 × 26 cm., 15 p., 8 fig. Richard Diener, Kentfield, California. [1920.]—Author claims to have made the following discoveries: (1) When parents are alike in size, the size of about 12 per cent of the offspring in the F₁ will be exactly double that of either parent, while the remaining 88 per cent will range in size between the size of the individual parents and their sum. (2) When parents differ markedly in size, the offspring will be smaller than either parent if the smaller parent is the mother, and very little larger than the larger parent if the latter is the mother. (3) The pollen-bearing parent is always the dominating factor in changes of form and color. (4) In attempting to derive new colors always use a white flower as the pollen parent "to break up the colors." (5) Among fowls, if two individuals are mated and the female offspring are mated back to the male parent, about one-third of the offspring of this second cross will be double the size of the animals originally mated. Basis of these generalizations are not specifically set forth.—*G. H. Skull.*

182. DREYER, TH. F. **A suggested mechanism for the inheritance of acquired characters.** *South African Jour. Sci.* 15: 272-277. 1917.—Author attempts to show that observed facts supporting WEISMANN'S theory are meager—that acceptance of theory by younger generation is partly a matter of sentiment. The character and properties of chromatin, lymph, and linin are reviewed. The linin being divided equally at cell division is considered as hereditary material on a par with the chromatin. A metabolic-products theory of heredity assumes the egg yolk to be specific for species, and assumes that it is a linin compound formed from radicals of the various tissues of the body. Reactions occur in different portions, so that it is not homogeneous; segmentation can thus split off different combinations of radicals which are built up into different tissues. Environmental factors may cause some of these radicals in the tissues to change so that the new yolk formed from the tissue radicals will contain new radicals from the altered tissues. Thus acquired characters could be reproduced in the next generation in the absence of the causative stimulus.—*J. L. Collins.*

183. DUERDEN, J. E. **Parallel mutations in the ostrich.** *Science* 52: 165-168. Aug. 20, 1920.—Ostriches are degenerate in some respects, but highly specialized in others. The North African Ostrich (*Struthio camelus*) and the South African (*S. australis*) differ in well-marked characters, at least one of which (feathering of head) is believed to be a simple Mendelian character. In other respects they are similar, and the author believes parallel evolutionary changes are in progress in them. The similarity in this respect is attributed to parallel mutations in germ-plasms of common origin. The suggestion is made that while the majority of factors are static, some may be increasing in potency while others are dwindling.—*L. J. Cole.*

184. DUNN, L. C. **Independent genes in mice.** *Genetics* 5:344-361. May, 1920.—Author tests for linkage of certain color factors in mice and finds that the following relationships exist: Pink-eye and piebald spotting are independent; pink-eye and non-agouti are independent; black-eyed white spotting and piebald spotting are independent; black-eyed white spotting and agouti are independent; black-eyed white spotting and pink-eye are independent; piebald spotting and non-agouti, give indications of slight linkage, 46.23 ± 1.2 per cent, "of doubtful significance."—Thus four independent groups of genes are established for mice with a possibility of a fifth. Two other groups are considered as possibilities from the data of other investigators.—*C. C. Little.*

185. DUNN, L. C. **Linkage in mice and rats.** *Genetics* 5:325-343. May, 1920.—Reviews established cases of linkage in mice and rats; albinism, pink-eye and red-eye in rats; albinism and pink-eye in mice.—On basis of extensive experiments, cross-overs of 14.5 per cent between genes for albinism and pink-eye in mice. Crossing over occurs in both sexes, in males 13.65 ± 3.81 per cent and in females 15.91 ± 0.466 per cent. This difference between sexes is 3.81 times its probable error. In rats linkage between albinism and red-eye results in 1.8 ± 0.54 per cent cross-overs; albinism—pink-eye cross-over = 21.1 ± 2.92 per cent. Red-eye—pink-eye crossovers = 18.3 ± 0.38 per cent. Linear order of genes is indicated. Males in latter cross show 15.56 ± 0.538 per cent cross-overs, females, 20.46 ± 0.525 per cent. This difference is 6.51 times its probable error. These sex distinctions are probably due to sexual differences not yet discovered, in either structure or functioning of chromatin.—*C. C. Little.*

186. EBSTEIN, E. **Zur Frage des Vorkommens von Kretinen und Albinos in Lerbach im Harz.** [On the occurrence of cretins and albinos in Lerbach in the Harz.] *Die Naturwissenschaften* 6:562-565. 1918.—In *Die Harzreise*, HEINE notes presence in Lerbach of cretins (*dumme Kropfleute*) and albinos (*weisse Mohren*). The consequent ill-repute of Lerbach has clung to it until present times. From medical literature and correspondence author finds that cretins existed in Lerbach at the time of HEINE's excursion in the Harz (1824), but that none have been known since 1830. Later lay references to cretinism are shown to be essentially repetitions of HEINE's statement without examination of facts. Author finds that at least two albinos lived in Lerbach in 1824, and that nine cases in three families exist at present time. Attention is called to erroneous confusion of cretinism and albinism as manifestations of same condition, and distinctions are drawn between cretinism and simple dwarf and goitrous cases. Diminution in cretinism is ascribed to failure of extreme cases to reproduce, and industrial development of Lerbach district leading to improvement in social and hygienic conditions, and introduction of fresh blood lines. Probable sources of HEINE's information are discussed, and a geological description of Lerbach district is included.—*R. E. Clausen.*

187. EDDY, W. H., H. LAKE AND A. B. LYMAN. **Report of committee examining Minnesota State Fruit-breeding Farm.** *Minnesota Hort.* 48:36, 37. 1920.—Gives a brief résumé of the most important work carried on at the farm.—*H. K. Hayes.*

188. ELBERTON, ETHEL M. **Life-history albums.** *Biometrika* 12:373-374. Nov., 1919.—This is a brief discussion of the relative merits of GALTON's and TAYLOR's family history albums, both from the point of view of the people throughout the country who may be induced to fill out the records, and of the statistical workers who will use the completed records in solving problems in heredity and eugenics. The Personal and Family History Register, compiled by Dr. TAYLOR places, author thinks, more emphasis than is justifiable on environment as a factor in improving the race, and gives too much space to information about direct ancestors, leaving none for collaterals, while cousins are as closely related to one another as grandparents to grandchildren, and data about them would be much more accurate and easily obtained. Author feels that both Dr. TAYLOR's Register and GALTON's Life History Album are too bulky and that the concise "Records of Family Faculties" issued by GALTON in 1884 would very well meet the needs of the statistical worker and should be reissued.—*Sylvia L. Parker.*

189. FISCHEL, ALFRED. Ursachen tierischer Farbkleidung. [Causes of animal coat color.] Arch. Entwicklungsmech. Org. 46: 202-209. 1920.

190. FISCHER, H. Pflanzenmetamorphose und Abstammungslehre. [Plant metamorphosis and evolution.] Die Naturwissenschaften 8: 268-271. 1920.—General discussion of evolution of plant organs and structures, with examples of problems and interpretations of plant metamorphosis. Series may be constructed which show orthogenetic trend, but this is not result of inheritance of acquired characters. Causes of orthogenesis are unknown, but can be only partially environmental. Evolution is not always in direction of utility, but may lead to extinction of some lines of descent. Changes resulting from alteration of living conditions are only certainly known as consequence of domestication, and they have no utility in preservation of species.—*R. E. Clausen.*

191. FISHER, R. A. The correlation between relatives on the supposition of Mendelian inheritance. Trans. Roy. Soc. Edinburgh 52: 399-433. 4 fig. 1919.—Derivation of formulae for correlation between direct and collateral relatives for characters determined by Mendelian factors, making allowance for different degrees of dominance, for assortative mating, for multiple allelomorphism, and for coupling. By means of fraternal correlation influence of dominance is distinguished from environmental causes of variability. Best available figures for human measurements show little or no indication of non-genetic causes. Marital correlation is probably genetic, not somatic. Hypothesis of cumulative Mendelian factors fits facts very accurately.—*John Rice Miner.*

192. FREEMAN, GEO. F. A progress report on cotton breeding at the Sultanic Agricultural Society. Sultanic Agric. Soc. Bull. 3. 16 p. 1920.—After discussing factors to be considered in breeding work with cotton, author outlines plan followed by him in Egypt, dealing with selection of mother plants, handling of pedigree-plant plots and increase plots, study of vegetative characters, flowering curves, yield and lint characters.—*T. H. Kearney.*

193. GALLAUD, M. Une lignée de Giroflées à anomalies multiples et héréditaires. [A line of wall flowers with multiple hereditary anomalies.] Compt. Rend. Acad. Sci. 171: 47-49. July, 1920.

194. GASSUL, R. Nachtrag zu meiner Mitteilung über "Eine durch Generationen prävalierende symmetrische Fingerkontraktur." [Supplement to my contribution on a symmetrical contraction of the fingers prevailing through generations.] Deutsch. Med. Wochenschr. 44: 1450. 1918.—The original paper (Bot. Absts. 5, Entry 377) had neglected to indicate the relationships of members of the family in which a form of congenital finger contractions was reported. It is now possible to present a chart of the family tree from which it appears that the peculiarity may behave as a (dominant) Mendelian trait.—*C. H. Danforth.*

195. GOODALE, H. D. Practical results from studies on egg production. Massachusetts Sta. Bull. 191: 97-104. 1 fig. 1919.—Paper is divided into three sections: I. Inbreeding. II. Is the influence of the male or of the female the more important? III. The exclusion of parasites.—I. A small number of data are presented which show that both inbreeding and outbreeding may either succeed or fail. The criterion of judgment on inbreeding must be the results in each individual case.—II. Author states that "the view that high fecundity does not descend from mother to daughter but does descend from mother to son, or from father to both sons and daughters is now generally accepted." Reports that "an experiment was made in which the male from a low line (breed not stated) was mated with several high producers belonging to a high line and at the same time to several low producers." "The offspring of the high producers averaged 49.2 winter eggs against an average of the mothers and their sisters of 52.5 eggs. Nearly all were high producers. On the other hand, the offspring of the poor layers averaged only 11.6 winter eggs. In this experiment high production clearly descended from mothers to daughters. . . . In still another experiment a male belonging to a low line was mated to a female belonging to another low line. Most of the offspring

were *high* producers. . . . These experiments show that we are dealing with a situation that is complicated in many ways." III. Author points out necessity of control of all parasites in studying the inheritance of fecundity and describes "the quarantine method" of rearing chicks.—W. A. Lippincott.

196. GOODALE, H. D. Is the inheritance of egg production an insoluble problem? Jour. Amer. Assoc. Instr. and Invest. Poultry Husb. 5: 73, 74. 1919.—Author points out that while improved egg production through selection is a demonstrated fact, the laws of the inheritance of egg production have not been established. The latter present a complex problem because egg production is a complex character made up of several subsidiary characters, the inheritance of each of which must be determined in advance. Five groups of difficulties in the way of solving the problem of the inheritance of egg production are suggested in the expressed hope that means of meeting them may be devised. These center around (1) the purity of stock, it being unlikely that stock pure for any of the hereditary factors concerned in egg production is in existence; (2) the need for larger numbers than may usually be secured from a single pair; (3) the character is expressed in one sex only, making it necessary to judge the genetic composition of males by their daughters; (4) the character is very sensitive to environmental differences which are difficult to avoid; and (5) the presence of insidious but unrecognized disease in the experimental flock, and the problems of disease resistance.—W. A. Lippincott.

197. GOWEN, JOHN W. Studies in milk secretion, V. On the variations and correlations of milk secretion with age. Genetics 5: 111-188. 9 fig. Mar., 1920.—A thorough biometric analysis of milk production in a single herd of Jersey cattle, involving 1741 eight-month lactation records. The mean and standard deviation are given for each age, together with the other constants necessary for fitting each distribution with the approximate skew curve. It is pointed out that there is a sufficiently close approach to the normal curve to justify use of the latter in many cases. Milk yield is found to rise to a maximum at 7.2 years, slowly falling thereafter, the whole curve being fitted best by a logarithmic function. The variability at different ages rises and falls in a somewhat similar curve which is fitted with a cubic parabola. The correlation between the yields at any two ages is found to average $+0.54$, there being little difference between the value for successive lactations and lactations more widely separated in time. The correlations between the yield in one lactation and the total in various combinations of lactations were also found, that between the first and four following, for example, being $+0.65$, and that between the first four and the fifth being $+0.69$. Regression formulae are given for calculating the most probable yield in a given year or group of years on the basis of a single lactation. The use of these formulae in culling a herd is discussed.—Sewall Wright.

198. GOWEN, JOHN W. Studies in milk secretion. VI. On the variations and correlations of butter-fat percentage with age in Jersey cattle. Genetics 5: 249-324. 8 fig. May, 1920.—The material for the study is taken from 1713 eight-months records of pure-bred Jersey cows, made in one herd under uniform conditions and management. Correlation coefficients and observed and theoretical means indicate the highest percentage butter-fat with the first lactation period, and a slight decline in percentage butter-fat with each additional lactation period. The standard deviation and the coefficient of variation for the butter-fat percentage for different ages—or succeeding lactation periods—remained approximately the same. The percentage fat for any one lactation period of a cow is an accurate indication of the butter-fat percentage to be expected in future lactation periods.—The difference for the correlation coefficients for one lactation's butter-fat percentage with that of another lactation, and for one lactation's butter-fat percentage with the butter-fat percentage over four lactation periods, gives a means of measuring the effect of environmental changes on the butter-fat percentage. It was found that the internal mechanism of the cow, which is probably hereditary, exercises six times the effect, in controlling butter-fat percentages, that the environmental changes have. The factors that control the butter-fat percentages have the same relative strength throughout the life of the cow to the exclusion of any group of factors acting for short periods.—R. R. Graves.

199. GRIER, N. M. Variation and distribution of leaves in *Sassafras*. *Biometrika* 12: 372-373. Nov., 1919.—Three kinds of leaves are found on *Sassafras* trees—three-lobed, two-lobed, and single-lobed. Single-lobed leaves constitute about two-thirds of the foliage and are found at the ends of the branches. Two- and three-lobed leaves are found in shaded positions on the tree and can be produced on terminal branches by shading.—*Karl Sax*.

200. GROSSER, OTTO. Die Lehre vom spezifischen Eiweiss und die Morphologie, mit besonderer Anwendung auf Vererbungsfragen und den Bau der Plazenta. [The doctrine of specific proteins and morphology, with special application to questions of heredity and the structure of the placenta.] *Anat. Anzeiger* 53: 49-57. May, 1920.—Not alone chemical structure but also living structure is significant in determining morphology. Expression "organ-forming substances" might well be replaced by "organ-forming germinal regions" (His, 1874). Inheritance may be assumed to depend on specificity of proteins. Single molecule is not to be regarded as *anlage* of organ, but only in interrelation with other molecules. Placenta excludes specific proteins of mother until they have been digested, whereby their specificity is lost. Mother is thus prevented from exercising larger influence in heredity.—*A. Franklin Shull*.

201. HAGEDOORN, A. L., EN A. C. HAGEDOORN-VAN VORSTHEUVEL LA BRAND. Het overgeerfde moment bij bacterieele ziekten. [The inherited factor in bacterial infection.] *Nederlandsch Tijdschr. voor Geneeskunde* 63: 179-182. 1919.—Experimenting with mice for the study of inheritance of body-weight, authors crossed a small Japanese mouse with a strain of great white mice. These experiments had resulted in a great collection of F_1 and F_2 animals (some thousands), as also of back-crosses between F_1 's and white or Japanese mice. In the spring of 1919 an epidemic disease broke out and made great ravages among the mice colonies. In the blood of 5 animals a specific *Staphylococcus* could be observed. All pure Japanese animals (60) died; white mice, inhabiting the same cages, survived. A great difference in susceptibility for this *Staphylococcus*-disease could be observed. In the other cages, this susceptibility was shown to be a Mendelian character and a recessive. The F_1 -animals survived; from the F_2 -animals 91 survived and 34 died (expected 93.75:31.25); back-crosses of F_1 's with Japanese mice gave 32 dead animals and 25 immunes; out of back-crosses between F_1 's and white mice only one of 51 animals died. These numerical relations make sure that the immunity against the *Staphylococcus*-infection is a dominant Mendelian factor according to the monohybrid scheme, susceptibility being the recessive. The first case of a simple inheritance of disease-resistance.—*M. J. Sirks*.

202. HALDANE, J. B. S. Note on a case of linkage in *Paratettix*. *Jour. Genetics* 10: 47-51. July, 1920.—NABOURS (*Jour. Genetics* 3: and 7:) showed that the various color patterns in the grouse-locust, *Paratettix texanus*, are due to a series of Mendelian factors which are multiple allelomorphs or else very intensely linked, plus a factor Θ which is allelomorphic to its absence. A re-examination of his data has demonstrated that in males the factor Θ actually shows a crossover value of about 24 per cent with any of the other factors, and in females a crossover value of about 46 per cent. The factor Θ thus exhibits a fairly marked linkage with all the others in males, and a very slight linkage in females. Slight differences in the crossover values appear between Θ and certain of the other pairs. If the so-called multiple allelomorphs are really closely linked factors, then their presence in the heterozygous condition may increase the linkage, since heterozygous factors have been shown to cause such increases in *Drosophila*. The type of linkage in *Paratettix* seems to be intermediate between the type found in *Drosophila* and *Bombyx* where no crossing over occurs in the digametic sex, and the type in plants and mammals where linkage is equal in the two sexes.—*H. H. Plough*.

203. HARALSON, C. Minnesota State Fruitbreeding Farm in 1919. *Minnesota Hortic.* 48: 34, 35. 1920.—Reports briefly on progress in testing new varieties.—*H. K. Hayes*.

204. HARRIS, J. ARTHUR. **Practical universality of field heterogeneity as a factor influencing plot yields.** Jour. Agric. Res. 19: 279-314. 10 fig. July 1, 1920.—Analysis is made of actual yields of plot tests reported by investigators for various root, hay, grain, and fruit crops. All fields were found to be heterogeneous, though they had been carefully selected for yield tests because of apparent uniformity. Soil heterogeneity is shown to have a real physical and chemical basis.—Author concludes that it is practically impossible to secure fields suitable for a direct comparison of yields. This fact emphasizes need of greater care in agronomic technique and of more extensive use of statistical method in analysis of the data from plot trials.—See also Bot. Absts. 6, Entry 480.—C. M. Woodworth.

205. HARTLEY, C. P. **Better seed corn.** U. S. Dept. Agric. Farmers' Bull. 1175. 14 p., 9 fig. 1920.—It is stated that low yields due to poor seed can be prevented by selecting seed corn (maize) in the field in the fall, and instructions are given for gathering, storing, grading, and testing the selected ears. Four experiments are summarized briefly as follows: (1) Varieties that produce most in some states are among the poorest in others. (2) Seed ears from the highest yielding rows of ear-to-row breeding plats have repeatedly produced better than ears taken from poorer rows. (3) Well-preserved seed was found to produce higher yields than seed injured by exposure, although both kinds germinated equally well. The difference between the two kinds is accentuated when they are grown in fertile soil. (4) Diseased ears or apparently healthy ears from diseased stalks give lower yields than disease-free ears from normal stalks.—J. H. Kempton.

206. HEAL, JOHN. **Hippeastrum (Amaryllis).** Gard. Chron. 68: 60. July 31, 1920.—Recounts the unsatisfactory results of crossing *Hippeastrum pardinum* with other *Hippeastrums*. Credits *H. Leopoldii* with more influence than any other *Hippeastrum* in production of best forms.—J. Marion Shull.

207. HEILBRUNN, L. V. **Studies in artificial parthenogenesis. III. Cortical change and the initiation of maturation in the egg of Cumingia.** Biol. Bull. 38: 317-339. May, 1920.—When the egg of *Cumingia* is shed into sea-water, the first maturation spindle has formed, but no polar bodies are thrown off unless the egg is fertilized or treated with the proper reagents. The immature unfertilized egg is surrounded by a stiff vitelline membrane which tightly encloses the fluid cytoplasm and effectively prevents the throwing off of polar bodies; it is only when the egg is released from this restraint that maturation can proceed. Such a release from restraint can be accomplished in three ways: by membrane elevation, by membrane swelling, and by rupture of the membrane. Substances which themselves have low surface tension produce a lowered surface tension of the membrane, and this results in its elevation from the egg surface. Acids, alkalis, and certain salt solutions cause the vitelline membrane to swell. The membrane may be removed from the egg by shaking, or it may be caused to rupture by immersion in dilute sea-water. Maturation in *Cumingia* is not dependent upon an increase in oxidation. Cortical change in *Cumingia* produces no increase in permeability either to dissolved substances or to water.—Bertram G. Smith.

208. HEINRICHER, E. **Ein Versuch Samen, allenfalls Pflanzen, aus der Kreuzung einer Laubholzmistel mit der Tannenmistel zu gewinnen.** [An attempt to secure seeds, perhaps plants, from the cross between the mistletoe of deciduous trees with that of the Coniferae.] Ber. Deutsch. Bot. Gesell. 37: 392-398. Dec., 1919.

209. HENNING, HANS. **Mnemelehre oder Tierpsychologie?** [The mneme theory or animal psychology?] Biol. Zentralbl. 39: 187-192. April, 1919.—Controversial article in which rather incidentally author denies identity of "individual memory" and heredity.—A. Franklin Shull.

210. HOOPER, J. J. **Inheritance of Jersey colors.** Jour. Dairy Sci. 2: 290-292. 1919.—This paper deals with the inheritance of self vs. broken color (white spotting), tongue color and switch color, in Jersey cattle. The data are largely taken from the American Jersey herd books. Broken color mated to broken color was found to give 194 broken color to 15 self

color; broken-colored bull to self-colored cow gave 179 broken color to 257 self color; and self colored bulls and cows gave 425 self color to 75 broken color. Citations of the progeny of certain bulls are given.—Mating white-tongue parents gave 71 per cent white-tongued. Mating parents of white switch gave 91 per cent white switch.—The suggestion is made, based on the fact that roan had disappeared from the Station herd, that the old roan Jersey is due to a dominant factor.—*John W. Gowen.*

211. HOSKING, A. *Hybrid Calceolarias*. *Gard. Chron.* 68:47, 61. 2 fig. July 24, 31, 1920.—A list of hybrid Calceolarias with brief descriptions and statement of parentage.—*J. Marion Shull.*

212. JARAMILLO, P. J., AND F. J. CHITTENDEN. *On double stocks*. *Jour. Roy. Hort. Soc.* 44:74-82. 2 pl. 1919.—Correlation shown between double flowering and vigor of plant at time of pricking out, and confirming the observations of Miss SAUNDERS to that effect.—*J. Marion Shull.*

213. KATHARINER, L. *Die Entwicklungsgeschichte der digenetischen Trematoden und die Kontinuität des Keimplasmas*. [The ontogeny of the digenetic trematodes and the continuity of the germ-plasm.] *Zool. Anzeig.* 51:220-223. Aug., 1920.

214. KIESSLING, L. *Über eine Mutation in einer reinen Linie von Hordeum distichum L.* [On a mutation in a pure line of *Hordeum distichum* L.] *Zeitschr. indukt. Abstamm. Vererb.* 19:145-159. June, 1918.—In the ninth generation of a pure line of *Hordeum distichum* L. a mutation occurred which is strikingly different from the parent form in many morphological and physiological characters. In appearance the mutant is somewhat larger than the unmutated plants and is lighter green in color, due to a reduction in chlorophyll. When the mutant was crossed with the parent form, all differences were inherited as if due to a single point-mutation. The author entertains the hypothesis that the mutation is concerned primarily with a reduction in chlorophyll, and that the morphological variations are merely expressions of the plant's readjustment to the decreased chlorophyll content.—*W. H. Eyster.*

215. KRONACHER, C. *Die deutsche Schweinezucht und Haltung nach dem Kriege*. [German swine breeding and maintenance after the war.] *Flugschr. Deutsch. Ges. Züchtungskunde* 41:1-47. 1918.—The author emphasizes the importance to Germany of complete independence from foreign countries in regard to food supply and the consequent importance of raising the swine population to its prewar level. The problem is primarily one of feeding rather than of breeding, and the first consideration is the basing of German swine husbandry wholly on home-grown feeds. As regards breeding, most stress should be placed on constitutional vigor, the extreme development of early maturity, and ease of fattening having proved deleterious in this respect.—*Sewall Wright.*

216. KRONACHER, C. *Allgemeine Tierzucht. Ein Lehr- und Handbuch für Studierende und Züchter. Vierte Abteilung (Abschnitt VI des Gesamtwerkes): Die Züchtung*. [General animal breeding. A text and handbook for students and breeders. 4th part (Section VI of the complete work): Breeding. 8 vo. 357 p. Paul Parey: Berlin, 1919.—The first chapter, 210 pages, deals comprehensively with selection, including discussion of systems of mating,—cross-breeding, pure-breeding, inbreeding, etc.,—considerations in the judgment of pedigree, performance, and conformation, discussion of fancy points, technical methods of judging, special considerations in judging breeding stock, etc.—The second chapter, 137 pages, deals with the physiology of reproduction in the domestic animals.—*Sewall Wright.*

217. LEAKE, H. MARTIN. *Report on the maintenance and improvement of the quality of Egyptian cotton and the increase of its yield*. Ministry Agriculture Egypt. Cairo. 38 p. 1920.—Author was invited by Egyptian Ministry of Agriculture to make "recommendations with a view to the maintenance and improvement of the quality of Egyptian cotton and the increase of its yield." His report deals with such matters as relation of commercial supply

and demand for particular types of cotton, to work of breeder and grower; impurity of commercial varieties in Egypt due to crossing and seed mixture; and relation of yield and quality to physical environment. He outlines a program of economic, botanical, and agricultural investigations looking to improvement of crop with especial emphasis upon breeding and increase of pure lines to replace present mixed commercial stocks. He discusses complications caused by uncontrolled introduction of new varieties.—*T. H. Kearney.*

218. LÉCAILLON, A. Sur la reproduction et le développement des bivoltins accidentels et de la première génération qui en dérive, chez le Bombyx du Mûrier. [On the production and development of accidental bivoltins and the first generation derived from them in the silkworm (*Bombyx mori*). *Compt. Rend. Acad. Sci.* 168: 366-368. 1919.

219. LIPPINCOTT, W. A. Pedigreeing poultry. *Kansas Agric. Exp. Sta. Circ.* 67. 16 p., 10 fig. 1918.—Methods of pedigreeing poultry, including methods of marking breeders and offspring, trapnests, methods of pedigree hatching, chick and mating indexes, marking of eggs, flock breeding records, pedigree blanks and egg records are given.—*H. D. Goodale.*

220. LITTLE, C. C. Alternative explanations for exceptional color classes in doves and canaries. *Amer. Nat.* 54: 162-175. Mar.-Apr., 1920.—The author reviews the explanation based on partial sex-linkage and non-disjunction previously offered to account for the appearance of exceptional color classes in doves and canaries, and concludes that neither is adequate. He then advances the theory that these occasional cases may be the results of mutative changes of the recessive factors to their dominant allelomorphs. His view has no more proof in existing data than the others, but has the advantage of avoiding the immediate expectation of color classes which have not been reported. [His suggestion, however, that female doves and canaries may be homozygous for dominant sex-linked factors is contrary to all present experience.]—*L. J. Cole.*

221. LLOYD-JONES, O., AND F. A. HAYS. The influence of excessive sexual activity of male rabbits. I. On the properties of the seminal discharge. *Jour. Exp. Zool.* 25: 463-497. 1918.—The plan of the experiment as stated by the authors was "to have the male accomplish, in as rapid succession as possible, a certain number of preliminary 'services' and then to mate him once to the breeding female from which the litter was desired. The 'end services' from which litters were secured for the progeny studies were the fifth, tenth, fifteenth and twentieth, and about an equal number of first-service litters were obtained as controls. When semen studies were made, however, it was aimed to recover specimens from the first and from every fifth service thereafter; thus, in a series of twenty services, five specimens of semen would ideally be recovered for study. This ideal set of specimens from a twenty-service series was seldom obtained, however."—It was shown that excessive sexual service causes decrease in amount of ejaculated semen, decrease in number of sperm cells per cubic millimeter, decrease in the proportion of sperm that show progressive motion, decrease in their duration of motion, decrease in percentage of fertile matings, and decrease in number of young per litter.—*H. L. Hbscn.*

222. LUNDBORG, H. Arv och miljö. Befolkningspolitiska synpunkter. [Inheritance and environment. Race-political views.] *Det nya Sverige* [Stockholm], 14: 3-12. 1920.—Author holds that great crossing of races degenerates constitution and increases degradation. Crossing of races takes place in a much greater degree among the lower and poorer part of the population than among the middle classes. Author has proved by his own investigations that the lowest classes—those which are in social respect the most degenerated of the population—consist to a greater extent of individuals with other race-qualities, such as darker hair and eyes, than the great bulk of the population. The middle class has a more homogeneous composition than the poorer ones. The biological sciences are nowadays promoting a new social evolution, by which the most important matters are life values and not wealth or other material advantages. Great and richly equipped eugenical scientific institutions must be established in all civilized countries.—*K. V. Ossian Dahlgren.*

223. MAC-AULIFFE, A. MARIE ET LÉON. Influence du milieu parisien sur la race. [Influence of Parisian environment on the race.] Compt. Rend. Acad. Sci. 171: 527-529. Sept., 1920.

224. MILEWSKI, A. W. Über Torniers experimentelle Untersuchungen, über das Entstehen pathologischer Verbildungen bei Tieren, sowie weiteres über experimentelles Erzielen von monströsen Goldfischarten. [On Tornier's investigations on the origin of pathological malformations in animals as well as further consideration of the experimental attaining of monstrous goldfish species.] Arch. Entwicklungsmech. Org. 44: 472-498. 1918.

225. MILLIKEN, C. S. Some facts about citrus bud selection. California Citrograph 5: 222. May, 1920.—A popular article emphasizing "bud selection" as essential for the most profitable production of citrus fruits.—Howard B. Frost.

226. NACHTSHEIM, HANS. Crossing-over-Theorie oder Reduplikations-hypothese? [The crossing-over theory or the reduplication hypothesis?] Zeitschr. indukt. Abstamm. Vererb. 22: 127-141. 4 fig. Jan., 1920.—A critical review of Trow's modification of the BATESON-PUNNETT hypothesis of reduplication as an explanation of coupling and repulsion (linkage) (Trow, A. H., Jour. Genetics 5: 1916). Although the more recent papers were not available to the author, it is concluded that the crossing-over hypothesis, as worked out in the studies on *Drosophila*, offers a better explanation of the phenomena.—H. H. Plough.

227. NAMYSLOWSKI, B. État actuel des recherches sur les phénomènes de la sexualité des Mucorinées. [The state of researches on sexuality in the Mucorineae.] Rev. Gén. Bot. 32: 193-215. 9 fig. 1920.

228. NESS, H. [misprinted as N. Hess]. Experiences in plant hybridization. Proc. Amer. Soc. Hort. Sci. 16: 52-60. (1919) 1920.—Author calls attention to fact that much which has been written concerning plant hybridization has been largely repetition of phenomena in stock examples.—Importance of plant hybridization was early appreciated by floriculturists, and from them we have many forms of begonia, canna, gladioli, etc. Their work resulted from an attempt to supply a demand and few records have been kept; thus the scientific value of the work has been greatly lessened.—The uncertainty of positive results makes hybridization work by the individual a somewhat uncertain financial proposition, and thus is best done by a publicly supported institution.—Author has worked with two genera, *Rubus* and *Quercus*, that with *Rubus* being an Adams Fund project. Has made many crosses among which were May's dewberry (*R. villosus*) also called Austin, by the Early Harvest blackberry (*R. argutus*). In the first generation the May's was almost completely dominant, and a good population was obtained. From the reciprocal crosses he failed to obtain any progeny, neither was he successful when Early Harvest was the mother and the pollen was secured from other sources. In these experiments several attempts were made with crosses of different varieties and species of *Rubus* but without success until he used seedlings of the raspberry, *R. rubicatus*, as the maternal parent; and the influence of this parent was manifest in subsequent generations. He notes: "The most remarkable part of these phenomena appears to me to be that fertility appeared only in the most robust group of those of the F₂ generation in which the raspberry was dominant; and that having once occurred, it became invariably hereditary just as though sterility was merely a passing crisis."—His work with *Quercus* shows that "the various individuals of a species vary widely in their affinity for foreign pollen. . . . To be successful in hybridization it is necessary to search out by trial individuals having the proper affinity for the pollen to be applied. For this purpose seedlings would naturally be preferred to plants produced vegetatively."—C. E. Myers.

229. ONSLOW, H. The inheritance of wing colour in Lepidoptera. III. Melanism in *Boarmia consortaria* (var. *consobrinaria*, BKH.). Jour. Genetics 9: 339-346. 1 pl. Mar., 1920.—Melandism of *consobrinaria*, crossed with the grayish speckled type, is dominant. In

four species of Geometrids, *Tephrosia consonaria* and *T. extersaria*, *Boarmia abietaria* and *B. consortaria*, a melanic variety has appeared in south England remote from the industrial regions of the North. That melanism is common in industrial and urban districts is explained by the correlation of a greater hardness with melanism. Natural selection, acting more drastically in the manufacturing areas "where the woods and vegetation upon which the larvae feed have been largely destroyed and elsewhere contaminated with a chemical deposit," weeds out individuals of the feebler type form, but permits melanic mutants to develop. Melanics of *B. consortaria* as well as of *T. consonaria* (var. *nigra*) seem to the author to be "earlier, stronger and larger than the type forms. Moreover, there is often a slight excess of melanics in most crosses."—The author calls attention to a curious inverse relationship between sex and the melanism of *consobrinaria* which he regards as fortuitous, though it occurs in a single inbred strain and the numbers, in at least one family, are of considerable size. This relationship appears in reciprocal crosses between the heterozygous dominant (melanic) \times recessive (type): Heterozygous (melanic) $\text{♀} \times$ recessive (type) ♂ gives approximately:

$\text{♀} \text{♀}$ 7 heterozygous: 9 recessive
 $\text{♂} \text{♂}$ 9 " : 7 "

Recessive (type) $\text{♀} \times$ heterozygous (melanic) ♂ gives: —

$\text{♀} \text{♀}$ 9 heterozygous: 7 recessive
 $\text{♂} \text{♂}$ 7 " : 9 "

Nearly half of the recorded matings between heterozygote and recessive (6 out of 14) fall into this too symmetrical scheme [that suggests an unorthodox sex-linkage or a sex-linked lethal factor destroying 25 per cent of every brood]. The numbers are small except in the following case: recessive (type) $\text{♀} \times$ heterozygous melanic ♂ , giving 64 melanic $\text{♀} \text{♀}$, 49 melanic $\text{♂} \text{♂}$; 49 type $\text{♀} \text{♀}$, 60 type $\text{♂} \text{♂}$.—*J. H. Gerould.*

230. PETCH, T. Variation in coconuts. Trop. Agric. Ceylon 54: 1. 1 pl. 1920.

231. PHIPPS, WILLIAM H. The law of hybridizing. Florists' Exch. 50: 814. Oct. 16, 1920.—A criticism of WESTON, T. A., Rev. of [DIENER, R.], The law of hybridizing, etc. [See Bot. Absts. 7, Entries 181, 248].—*G. H. Shull.*

232. POWELL, GEORGE T. Thirty years' experience in the application of bud selection in the fruit industry. California Citrograph 5: 344, 364-366. 4 fig. Sept., 1920.—A paper read at a meeting of California nurserymen. Over 30 years ago, the writer publicly advocated propagation from superior orchard trees. Discussion largely relates to the apple. Writer has several thousand apple trees, "practically all" propagated from carefully selected bearing trees; the apparent results are excellent, though comparative tests are not reported. The opinion is expressed that selection for resistance to cold and to disease is important.—*Howard B. Frost.*

233. PRIDHAM, J. T. Natural crossing in wheat. Agric. Gaz. New South Wales 31: 457-461. 2 fig. 1920.—Quotations from various authors are given, as to relative abundance of natural crosses. The author cites a few instances of natural crosses coming under his own observation and mentions one commercial variety, Marshall No. 3, an Australian wheat which originated as a natural cross.—*L. R. Waldron.*

234. PRIDHAM, J. T. The selection of promising wheat plants. Agric. Gaz. New South Wales 31: 548. 1920.—Suggestions to farmers for selecting plants from fields suitable for future increase.—*L. R. Waldron.*

235. REICHERT, E. T. A biochemic basis for the study of problems of taxonomy, heredity, evolution, etc., with special reference to the starches and tissues of parent-stocks and hybrid stocks and the starches and hemoglobins of varieties, species and genera. Carnegie Inst. Washington Publ. 270. Part 1, xi + 376 p., 34 pl., 820 fig. Part 2, vii + 377-834. 1919.—This memoir,

in two large volumes, is designated as complementary and supplementary to the author's (and Brown's) well-known earlier crystallographic studies of the hemoglobins, and to his work on the stereochemistry of protoplasmic processes and products as displayed through the differentiation and specificity of starches (Nos. 116 and 173, respectively, of the Carnegie Institution of Washington). Like its predecessors the present study is regarded as exploratory in character. The main thesis of the three sets of studies is that "in different organisms corresponding complex organic substances that constitute the supreme structural components of protoplasm and the major synthetic products of protoplasmic activity are not in any case absolutely identical in chemical constitution, and that each such substance may exist in countless modifications, each modification being characteristic of the form of protoplasm, the organ, the individual, the sex, the species, and the genus."—Since the molecule of such a protein as serum-albumin may have as many as 1000 million stereo-isomers, the inconceivable number of possible constitutional differences in the corresponding proteins of different individuals is obvious. The author believes that the collective evidence available today indicates that every individual is a chemical entity that differs in characteristic particulars from every other, and that differences in chemical constitution and composition can account for all the differences which serve to characterize genera, species, and individuals. Being an inert, non-living synthetic product of metabolic activity which bears no resemblance to the protoplasm that gives rise to it, starch may be used as an indicator in determining whether the products of synthesis are correspondingly modified with the stereochemical peculiarities of the protoplasm by which they are produced. REICHERT finds that such is the case. Moreover, since such differences are diagnostic, they constitute "a strictly scientific basis for the classification of plants." The present research treats mainly of the properties of parent-stocks and hybrid-stocks, and correspondingly, of heredity. The author thinks that the importance of hybridization in the genesis of species has been greatly underrated. He expresses the object of his research as follows: "In both of the preceding researches satisfactory evidence was recorded to justify the conclusion that complex organic substances exist in different stereo-isomeric forms in different organisms, and that the differences are specific in relation to genera, species, and varieties, and in general in striking accord with the accepted data of the systematist. Naturally it seemed to be a matter of the greatest fundamental importance to determine to what recognizable degrees these physico-chemical properties are transmitted from seed and pollen parents in altered or unaltered form in the hybrid; if it is possible to predict the heritability of this or that property: whether or not new physico-chemical properties appear in the hybrid; and if the phenomena of physico-chemical inheritance are not only consistent with, but also in explanation of, the data of the systematist and with the experience of the plant breeder." In connection with a discussion of the criteria of hybrids and mutants he translates a lecture of Focke (1881) rarely found in libraries, which summarizes under five propositions a great amount of data pertaining to hybrids and their offspring. REICHERT regards Mendelism as of value merely in explaining certain phenomena of inheritance and but one of several types of mechanisms of heredity. He uses the term "unit-character" and "unit-character phase" repeatedly but apparently not in the accepted Mendelian sense, for he says: "The term character is used throughout this research in a conventional sense to signify any property that serves to characterize any part or property of starch or plant. Inasmuch as each such property is a unit of comparison, each may appropriately and advantageously be referred to as a unit-character." What he finds regarding starch characters in hybrids when compared with those of parents may be summarized in his own words: "If starch characters are heritable they should, in order to meet theoretic requirements, exhibit peculiarities of inheritance corresponding to those observed in gross and microscopic anatomic plant characters. This deduction will be found to have ample justification in the results of this research. Herein it will be found that the starches of the hybrids frequently exhibit in histologic, polariscopic, and physico-chemic properties some degree of intermediateness between the parents, usually nearer one or the other. In any given hybrid certain of the properties may be exactly or practically exactly intermediate and other properties may be identical with the corresponding properties of one or the other parent. In many instances one or more of the characters of the hybrid, such as the relative

number and the types of compound grains, the degree of fissuration, the regularity or irregularity of the forms of the grains, the characters of the hilum, the distinctness and size of the lamellae, the polariscopic properties, the temperature or gelatinization, the aniline reactions and the qualitative and quantitative reactions with the various chemical reagents, were developed or manifested in degrees beyond the parental extremes. Moreover, peculiarities of various kinds were observed at times in the hybrid that were not apparent in either parent."—In general he concludes that "the results of the hemoglobin and starch researches are mutually confirmatory in support of the existence of stereo-isomeric forms of complex organic substances that are specifically modified in relation to varieties, species, subgenera, and genera, and that these specificities indicate corresponding peculiarities of the protoplasm in which the substances are formed."—In Chapter VI of Volume I, the author discusses the applications of the results of his researches under the following headings: specificity of stereo-isomerides in relation to genera, species, etc.; protoplasm a complex stereo-isomeric system; the germ-plasm a stereochemic system; protoplasmic stereochemic system applied to the explanation of the mechanism of variation, sports, fluctuations, etc.; protoplasmic stereochemic system applied to the genesis of species.—Part 2 (a separate volume), "Special, general and comparative laboratory data of the properties of the starches and of the tissues of parent-stocks and hybrid stocks," consists of the laboratory records prepared by two of the author's assistants, Dr. ELIZABETH E. CLARK, and Miss MARTHA BUNTING.—*M. F. Guyer.*

236. ROSENBERG, O. Weitere Untersuchungen über die Chromosomenverhältnisse in *Crepis*. [Further studies on the chromosome relations in *Crepis*.] Svensk. Bot. Tidskr. 14: 319-325. 5 fig. 1920.—In *Crepis Reuteriana* there are quite normal grains with only two (normally three) chromosomes to be found. This depends on abnormalities in the reduction division. Of *Crepis Reuteriana* ($2x = 6$) a *gigas* mutation with 12 somatic chromosomes is found, each of the three chromosome types being represented by four chromosomes. A great deal of polyploidy is now known in the genus. *Crepis biennis* and others have 42 somatic chromosomes. These species may be interpreted as 14-ploid, possessing only the same 3 types of chromosomes as we find in *Crepis vicens*, but repeated 14 times.—*K. V. Ossian Dahlgren.*

237. RUNNSTRÖM, J. Befrukningens och fosterutvecklingens problems. [The problems of fertilization and embryology.] Vetenskap o. Bildning 30. 282 p., 109 fig. A Bonnier: Stockholm, 1920.—Contains a treatise on the origin and evolution of the cell-idea. Aims to give a comprehension of the physiology of cell-division and fertilization, illustrating chief problems of the mechanics of evolution by some examples. Last chapter treats of endocrine secretion of sex-glands, etc. Some results are new, being taken from the author's own still unfinished studies on the mechanics of evolution as exemplified in sea-urchin eggs. Working with sea-water free from K or Ca, may produce a symmetrical system perpendicular to the normal one. Author also demonstrates some experiments to eliminate the echinid rudiment which is to be found at the left side of the larva. In spite of the extirpation of this rudiment, certain symmetrical changes take place in the alimentary canal. A new mouth and a new oesophagus may be developed. The latter is often produced in a manner different from that of the normal metamorphosis. Changes of the rectum differing from normal development are also found. In some cases three quite atypical organs have been discovered: (1) A ciliated organ, that produces an excretion, in connection with the anus. (2) An outgrowth from the body, produced by cylindrical epithelium with capacity of secretion and liable to be regenerated. (3) A pocket-like formation with ciliated cells. The author considers that genes exist in sea-urchin eggs, the effects of which are normally suppressed by the great development of the echinid rudiment.—*K. V. Ossian Dahlgren.*

238. RUŽICKA, VLADISLAV. Restitution und Vererbung. Experimenteller, kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. [Restitution and heredity. Experimental critical and synthetic contribution to the problem of determination.] Vortr. u. Aufsätze u. Entwicklungsmech. Org. 23: 69 p. 1919.

239. SCHRADER, FRANZ. Sex determination in the white-fly (*Trialeurodes vaporariorum*). Jour. Morph. 34: 267-305. 4 pl. Sept. 20, 1920.—Other workers had discovered that virgin females of this white-fly produce only males in America, but only females in England. Author shows that number of chromosomes in American race is 22 except in pseudo-vitelline or mycetoma cells, where number is 30 or more. In female, maturation includes two divisions, and mature egg contains eleven chromosomes. If egg is unfertilized, it produces male with eleven chromosomes. In spermatogenesis reduction division is completely suppressed and spermatozoa have haploid number of chromosomes. Whether egg is fertilized or not is in some way controlled in female.—Author suggests parthenogenetic production of females (as in England) may be due to reunion of polar nucleus with egg nucleus, or to doubling of number of chromosomes at some stage. If fertilized eggs of English race produce both sexes, explanation may be that entrance of spermatozoön causes reduction of chromosomes in egg (a process omitted or neutralized in parthenogenetic egg), but some of spermatozoa do not function any further, leaving egg to develop with haploid number and produce male.—English race is supposed to have originated from American, perhaps by mutation. Occurrence of some males in England may be result of importation from America.—A. Franklin Skull.

240. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and C. L. DYER. Citrus-fruit improvement: a study of bud variation in the Eureka lemon. U. S. Dept. Agric. Bull. 813. 88 p. 18 tables, 22 fig. June, 1920.—The methods employed in this investigation have been, in general, like those used in the three previously reported studies of orange and grapefruit varieties (see Bot. Absts. 2, Entries 707, 708, 709). Selected plots in Eureka lemon orchards including 252 trees altogether, have furnished detailed records of yield, grade, etc., while coöperative arrangements have given individual records for about 14,000 trees. Extensive statistical data, covering about 6 years (1911-1917) are presented.—Eight strains of Eureka lemon are described, all of which "have been traced to individual fruit or limb variations in trees growing under normal conditions," and have been experimentally propagated by budding. These strains differ in many characters, such as habit of growth, size and shape of leaves, productiveness, shape of fruit, thickness of rind, and season of production. The Eureka strain, which is that most typical of the variety as usually grown, is the only type desirable for commercial lemon production. Trees of certain other types, such as the Shade-tree strain, are numerous in some orchards, evidently because of the former practice of using as budwood the vigorous non-bearing shoots, which are especially numerous with these strains.—The authors advise that all buds for propagation be taken from shoots bearing normal fruits, and that these bud sticks be cut only from superior performance-record trees; also, that orchard trees of inferior strains be top-worked or replaced.—Howard B. Frost.

241. SHAMEL, A. D., L. B. SCOTT, C. S. POMEROY, and C. L. DYER. Citrus-fruit improvement: a study of bud variation in the Lisbon lemon. U. S. Dept. Agric. Bull. 815. 70 p., 13 tables, 14 fig. June, 1920.—The work with the Lisbon lemon closely paralleled that with the Eureka lemon (see Bot. Absts. 7, Entry 240) in methods, general results, and conclusions. Detailed records were secured for 128 trees in selected plots, and coöperative records for about 13,000 trees. Five definite strains are described in detail; others have been observed but not thoroughly studied. Of these five strains, the Lisbon strain, representing "the established ideal for the Lisbon variety," is the most productive. The Open strain, though less hardy and productive, has an advantage in its tendency to produce fruit throughout the year, resembling the Eureka strain of the Eureka variety in this respect. In some orchards the Open strain predominates, and in others the Lisbon strain. The other strains are markedly inferior.—Howard B. Frost.

242. STARK, MARY B. A benign tumor that is hereditary in *Drosophila*. Proc. Nation. Acad. Sci. [U. S.] 5: 573-580. 5 fig. Dec., 1919.—A new benign tumor appeared in a stock of *Drosophila*. By inbreeding, a strain true to the tumor character was established. One gene for the tumor is situated in the third chromosome close to dichaete. Extraction of the

tumor character in only five per cent of the flies shows other genes also involved. These are under investigation. 780 larvae show from one to three tumors situated in 6, 8, 9, 10, 11, 12, 13 or 14th segments. Metastases may or may not be present. Tumor may also be in head or may replace wing or other appendages. Tumor cells are rounded or polygonal and contain pigment. Pigment increases with age. Cells giving rise to tumor are originally hypodermal. Tumor in adult fly is permeated with black pigment. When tumor develops in abdomen, no shortening of life in fly results. Tumor was inoculated in 40 larvae; only 2 survived; both grew tumor and were sterile females.—C. C. Little.

243. TÄCKHOLM, G. On the cytology of the genus *Rosa*. A preliminary note. Svensk. Bot. Tidskr. 14: 300-311. 3 fig. 1920.—Very brief summary of author's chief results. About 300 bushes, representing approximately 230 different forms, are investigated. The fundamental haploid chromosome number in *Rosa* is 7. There are two very different groups of species: (1) the very polymorphous *canina*-section (in the widest sense), and (2) all other sections. The latter group have only gemini (7, 14, or 21) in the diakinesis; the former possess both paired chromosomes and single ones. The following table gives the observed numbers:

TYPE	BIVALENTS	SINGLES	SOMATIC	X-PLOIDY
1	7	—	14	Diploid
2	14	—	28	Tetraploid
3	21	—	42	Hexaploid
4	7	7	21	Triploid
5	7	14	28	Tetraploid
6	7	21	35	Pentaploid
7	7	28	42	Hexaploid
8	14	7	35	Pentaploid
9	14	14	42	Hexaploid
10	Variable	Variable	32-36	Anorthoploid

The roses of types 1-3 have only sexual reproduction. Some of this species have varieties with different chromosome numbers (haploid number 7 and 14; 14 and 21). Triploid roses (type 4) may be hybrids between types 1 and 2. Type 8 may be interpreted as the result of a cross between types 2 and 3. The reduction division in the anthers is quite in accordance with the *Drosera*-hybrid scheme of ROSENBERG. The immense number of forms belonging to the section *Caninae* (in the widest sense) are distributed in the types 5-7. The reduction divisions of the *Caninae* in the anthers and the ovules are carried out in a quite different manner. In the pollen mother cells, the gemini first come to the equatorial plate. Later the univalent chromosomes which are scattered irregularly on the spindle are also arranged in the same plate surrounding the gemini. The partners of the bivalents first pass to the poles. The singles lag a little, divide, and then the halves pass to the poles. The bivalent and univalent chromosomes consequently have different anaphase stages. Not all the halves of the singles may be included in the daughter nuclei. By the second division the descendants of the bivalents are regularly distributed and included, without or with a few of the other chromosomes in the four ordinary microspores. There even arise a great number of small microspores from each mother cell, containing only descendants from the univalent chromosomes. Some of the microspores—probably those containing descendants of the bivalents—develop into pollen grains, are able to germinate, and must be supposed to be capable of fertilization (hybrids between roses in the section *Caninae* are known). In the embryo-sac mother cells we have ordinarily the two equatorial plates—the bivalents next to the chalaza, the singles next to the micropyle. In the anaphase the partners of the gemini are separated; but in about four-fifths of the studied cases, all the singles pass undivided to the micropylar pole. In the second division all the chromosomes are divided. Consequently, the tetrad has two large nuclei and two smaller ones, with only 7 chromosomes. The former

are also included in the greater cells. Eggs which have taken their origin from the larger megaspores are capable of fertilization, as proved by the chromosome sets in hybrids between plants of the section *Caninae* and normally sexual roses. In spite of the sexual potency of the *Caninae* their propagation is almost exclusively apomictical. This fact explains the constancy of the mentioned chromosome sets. Type 10 must be supposed to be originated by fertilization.—“All species and forms investigated, belonging to the section *Caninae*—i.e., the majority of the examined roses, originated in Europe, North Africa and West Asia—are very ancient hybrids representing the F_1 generation, which, ever since its origin thousands of years ago, has been maintained owing to apomictical reproduction.” The anorthoploids represent F_2 or any later generation of crosses. The apomictical reproduction was probably induced by these ancient crosses. To explain all the chromosome sets in the *Caninae*, the existence of octoploid and decaploid sexual forms is assumed. The enormous polymorphism in the *Caninae* is to be ascribed to hybridism. Also vegetative mutations produced in apomictical stocks have no doubt contributed to the polymorphism.—*K. V. Ossian Dahlgren.*

244. THOMSON, GODFREY H. On the degree of perfection of hierarchical order among correlation coefficients. *Biometrika* 12: 355-366. 2 fig. Nov., 1919.—Derivation of Hart-Spearman criterion for degree of hierarchical order (degree in which correlations of any two mental tests with others are in same sequence of magnitude) neglects important term. With correlated dice throws, where true correlations are known *a priori*, criterion exaggerates perfection of hierarchy.—*John Rice Miner.*

245. VANDEL, M. A. Sur la reproduction des Planaires et sur la signification de la fécondation chez ces animaux. [On the reproduction of some Planarians and on the significance of fecundation in these animals.] *Compt. Rend. Acad. Sci.* 171: 125-128. July, 1920.

246. WEATHERWAX, PAUL. A misconception as to the structure of the ear of maize. *Bull. Torrey Bot. Club* 47: 359-362. 6 fig. Aug., 1920.—An attempt to refute the evidence published by COLLINS which indicated that the ear of maize may have developed through the twisting of yoked pairs of spikelets. The author contends from an examination of the cobs of several mature ears that dropping of rows of seeds is due to the discontinuance of a row of paired spikelets and not to the loss of the pedicelled spikelets from yoked pairs, as suggested by COLLINS. In conclusion it is stated that there is no indication that short rows represent long rows partially aborted, but that the abortion of spikelets or of rows in the ear seems to be much more constant as a characteristic of theories than of real ears. Figures four and six apparently have been transposed.—*J. H. Kempton.*

247. W[ESTON, T. A.] [Rev. of: [DIENER, RICHARD]. The law of hybridizing discovered by Richard Diener. 90 x 27 cm., 15 p., 8 fig. Richard Diener: Kentfield, California, [1920.]] *Florists' Exch.* 50: 554. Sept. 11, 1920.—See also Bot. Absts. 7, Entries 181, 231, 248.

248. W[ESTON, T. A.] The law of hybridizing. *Florists' Exch.* 50: 981. Nov. 6, 1920.—Reply to WILLIAM H. PHIPPS's criticism of the author's review of [DIENER, R.] The law of hybridizing discovered by Richard Diener. See Bot. Absts. 7, Entries 181, 231, 247.—*G. H. Shull.*

249. WOLL, F. W., AND PAUL L. DOUGHERTY. Advanced registry testing of dairy cows. *California Agric. Exp. Sta. Circ.* 218. 15 p. 1920.—Presents arguments for the advanced-registry testing of pure-bred cows, cites records made in California, and gives instructions on how to initiate such a test in California.—*John W. Gowen.*

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J. H. GOURLEY, *Editor*

FRUITS AND GENERAL HORTICULTURE

250. ALLEN, W. J., AND W. C. GAY BRERETON. Orchard notes, July. Agric. Gaz. New South Wales 31: 523-525. 1920.—A discussion of pruning of the apple and pear and its relation to the production of fruit buds.—*L. R. Waldron.*

251. ALLEN, W. J., AND W. C. GAY BRERETON. Thompson's Improved and Navalencia oranges. Agric. Gaz. New South Wales 31: 519. 1920.

252. ANONYMOUS. American books on agriculture. [Rev. of: GOULD, H. P. Peach growing. (Rural Science Series.) xxi + 426 p., 32 pl. Macmillan Co.: New York, 1918.] Nature 104: 496-497. 1920.

253. ANONYMOUS. American-grown fruit stocks. Nation. Nurseryman 28^o: 215. 1 fig. 1920.—A brief history and description of the growing of fruit stocks in America is given. Practically all the apple seedlings in the United States are raised in the Kaw Valley, Kansas. Efforts to grow them on a large scale in other places have not met with marked success.—*J. H. Gourley.*

254. ANONYMOUS. A pear tree trained in an unusual way. Nation. Nurseryman 28^o: 180. 1 fig. 1920.—A description is given of a pear tree trained in the form of a table. It is growing on the grounds of Bobbink and Atkins Nurseries, Rutherford, New Jersey.—*J. H. Gourley.*

255. ANONYMOUS. La multiplicación de las plantas. [The propagation of plants.] [Rev. of CALVINO, MARIO. Tratado sobre la multiplicación de las plantas. 264 p. 244 photographs. Graphical Arts Press: Habana, 1920.] Rev. Agric. Com. y Trab. [Cuba] 3: 149-151. 1 fig. 1920.—The table of contents of the book is included in the review.—*F. M. Blodgett.*

256. ANONYMOUS. Problems of the fruit grower. [Rev. of: BEDFORD, DUKE OF, AND SPENCER PICKERING. Science and fruit growing: being an account of the results obtained at the Woburn experimental farm since its foundations in 1894. xxii + 351 p. Macmillan and Co.: London, 1919.] Nature 104: 558-559. 1920.

257. ANONYMOUS. Tests with unfruitful plum trees. New Zealand Jour. Agric. 20: 9. 1920.—Pruning, ring-barking, and root-pruning gave no results. Interpollination was effective.—*N. J. Giddings.*

258. ANONYMOUS. The avocado in Trinidad. Agric. News [Barbados] 19: 46. 1920.—A review of a paper on the subject by W. G. FREEMAN in the *Bulletin of the Department of Agriculture*, Trinidad, in which the history, process of selection, etc., are discussed. A paper by R. O. WILLIAMS on budding the avocado is also reviewed.—*J. S. Dash.*

259. BRAINERD, EZRA, AND A. K. PEETERSEN. Blackberries of New England.—Their classification. Vermont Agric. Exp. Sta. Bull. 217. 84 p., 36 pl. 1920.

260. CAMPBELL, J. A. Natural cool-air fruit storage. New Zealand Jour. Agric. 20: 166-167. 1920.—The methods in use in the United States are briefly outlined. It is feared that the same methods could not be used in New Zealand.—*N. J. Giddings.*

261. CAMPBELL, J. A. The fruit industry in North America. New Zealand Jour. Agric. 20: 24-27. 1920.—One of a series of articles. This deals with coöperation and standardization as practiced in the fruit regions of the United States and Canada.—*N. J. Giddings.*

262. CAMPBELL, J. A. **The fruit industry of North America.** New Zealand Jour. Agric. 20: 110-113. 1 fig. 1920.—The eastern and western sections of the United States are compared as to methods of apple culture and orchard practice. The possible relation of seedling stock to tree growth is also discussed.—*N. J. Giddings*.

263. GUNLIFFE, R. S. **The propagation of some tropical fruits.** Agric. News [Barbados] 19: 52-53, 150-151. 1920.—The first part of the article deals principally with the avocado pear. Varieties of this fruit are discussed, and detailed information is given as to methods of budding and grafting, including seed-grafting. In the latter part of the article, the mango is dealt with in the same manner.—*J. S. Dash*.

264. DARROW, WILLIAM H. **Government inspection of fruit shipments.** Rept. Vermont State Hortic. Soc. 17: 21-34. 1919.—This is an account of the work of the Federal Government, through the Bureau of Markets, to assist the fruit growers all over the country in marketing their crops.—*George P. Burns*.

265. DUTTON, W. C. **Dusting and spraying experiments of 1918 and 1919.** Michigan Agric. Exp. Sta. Special Bull. 102. 50 p., 20 fig. 1920.

266. ESAM, G. **Fruit cool storage.** New Zealand Jour. Agric. 20: 10-18. 1920.—Several varieties of apple and of pear were tested to determine best time for picking, best method of picking and handling, effects of delay between picking and storing, and possible advantage of wrapping. Fruits which had reached the stage denoted by a change of ground color kept best in storage. Fruits which were well advanced and showed good color deteriorated too quickly when removed. The importance of care in handling was shown in various tests. Delay in placing the fruit in storage greatly reduced its keeping quality. Wrapping was found to give better fruit, but this is to be tested further.—*N. J. Giddings*.

267. GALLOWAY, BEVERLY T. **Some promising new pear stocks.** Amer. Nurseryman 32: 34-35. 1920.

268. GASSER, G. W. **Report of the work at Rampart Station.** Rept. Agric. Exp. Sta. 1917: 34-57. Pl. 3, 4. 1919.—See Bot. Absts. 7, Entry 26.

269. GEORGESON, C. C. **Reports from seed and plant distribution.** Rept. Alaska Agric. Exp. Sta. Rept. 1917: 86-90. 1919.—Gives extracts from letters received from residents of Alaska giving their experience with the seeds and plants distributed by the Alaska stations.—*J. P. Anderson*.

270. GEORGESON, C. C. **Summary of the work at the several stations.** Rept. Alaska Agric. Exp. Sta. 1917: 5-33. 2 pl. 1919.—After a review of weather conditions the author summarizes the work carried on at the Sitka, Rampart, Fairbanks, Kodiak, and Matanuska stations, and gives notes on cooperative work. The Sitka station is devoted to horticulture. Notes are given on potatoes, including the growing of plants from seed balls. Notes are also given on other vegetables, such as cabbage, cauliflower, broccoli, Brussels sprouts, kale, kohlrabi, turnips, radishes, beets, carrots, onions, peas, broad beans, snap beans, asparagus, rhubarb, lettuce, celery, garden cress, parsley, and herbs. Beets, onions, snap beans, asparagus, and most herbs are not adapted to the climate, but the others mentioned above do well. In the orchard some apples blossomed, but owing to an unfavorable season no fruit matured. Gooseberries and currants did not fruit as well as usual. Raspberries (*Rubus strigosus*) produced fruit despite an unfavorable season. Strawberry-breeding work was carried on, and 1333 seedlings set out the previous season received numbers. A large amount of nursery stock was distributed to settlers. Reports are made on the behavior of 30 species of shrubs and of several shade trees. Thirty-five species of hardy perennial plants are reported favorably and 27 unfavorably. Of annual flowering plants 24 species are reported favorably and 13 unfavorably. All annual and perennial plants listed are well-known sorts. Roses are also being tested in the trial grounds. Work at the other stations is given in more detail by the assistants in charge of each.—*J. P. Anderson*.

271. GOODWIN, W. T., AND W. C. HYDE. **Coöperative fruit variety testing.** New Zealand Jour. Agric. 20: 178-180. 1920.—The variety orchards are 7 years old and include about 75 varieties of apple, 24 varieties of pear, and several varieties of apricot, plum, and cherry. Tree growth and fruitfulness are the chief factors considered.—*N. J. Giddings*.

272. GOULD, H. P. **Fruit trees stocks used in propagation.** Amer. Nurseryman 32: 42-44. 1920.

273. GOULD, W. M. **Production of nursery stock.** Rept. Vermont State Hortie. Soc. 17: 12-20. 1919.—The problems confronting the grower of nursery stock, including both fruit-producing trees and plants for ornamental use, are discussed, chiefly from the standpoint of production.—*George P. Burns*.

274. HALLIGAN, C. P. **Increasing the production of the bearing apple orchard.** Michigan Agric. Exp. Sta. Circ. 43. 18 p., 6 fig. 1920.

275. HOLDEN, BERTHA A. **Ways of using surplus fruits.** Rept. Vermont State Hortie. Soc. 17: 43-46. 1919.

276. HOWARD, W. L. **Brown rot of apricots and its prevention.** Better Fruit 15: 7. 1920.

277. LEWIS, C. I., F. R. BROWN, AND A. F. BARSS. **Observations on the evaporation of prunes.** Better Fruit 15: 5, 29-31. 1920.—A reprint from Oregon Agric. Exp. Sta. Bull. 145 (1917).

278. MAGNESS, J. R. **Investigations in the ripening and storage of Bartlett pears.** Jour. Agric. Res. 19: 473-500. 8 fig. 1920.—Fruits grown in Pacific-coast regions and picked at intervals from early summer until after the commercial picking season, were analyzed within a few days after picking and after being in storage $1\frac{1}{2}$ to $3\frac{1}{2}$ months at temperatures of 70°, 40°, and 30° F. The total sugar in freshly picked fruit showed a uniform increase as the season advanced, the less rapid increase in reducing sugars during the latter part being counterbalanced by a greater accumulation of sucrose. Pears ripening at 70° contained the highest percentage of sugar, those ripening at 40° the lowest, and those held at 30° for 6 to 14 weeks an intermediate amount. The acid content decreased with an advance of the season in pears from California, but increased in fruit from Oregon and Washington. Little change in acidity was found during storage of fruit that had been well matured at picking time; but an increase in acidity generally occurred during storage at 70° of fruit picked before maturity, while a decrease was often found after ripening at 40° and especially after being held at 30° F. There was a progressive reduction in the alcohol-insoluble, acid-hydrolyzable reducing materials as the season advanced, not only in the fruit as picked, but also in the same fruit after ripening in storage. The percentage of solids, lowest at about the opening of the season, tends to increase with the accumulation of sugar in late-picked lots. Although late-picked fruit tends to become yellow more quickly than early-picked lots, it remains free from scald and in firm, prime eating condition for a much longer period after becoming ripe.—The application of the results as applied to commercial handling are briefly discussed.—*A. J. Heinicke*.

279. MORRIS, R. T. **Grafting with the aid of paraffin.** Jour. New York Bot. Gard. 21: 157-159. pl. 250. 1920.—A brief outline is presented, and the claim is made that the grafting season can be extended over a period of 5 months.—*H. A. Gleason*.

280. MURRILL, W. A. **Trees girdled by meadow mice.** Jour. New York Bot. Gard. 21: 94-97. 1920.—The habits of meadow mice and the destruction to plants caused by them are discussed.—*H. A. Gleason*.

281. RAMSEY, H. J., AND S. J. DENNIS. **Operating air-cooled apple storage houses.** Better Fruit 15³: 10, 32-34. 1920.—A verbatim excerpt from U. S. Dept. Agr. Farmers' Bull. 852 (1917).

282. RICALTON, JAS. **The cocoa-nut palm.** Amer. Forest. 26: 529-531. 3 fig. 1920—A popular description of *Cocos nucifera* and its products.—Chas. H. Otis.

283. ROBERTS, GEORGE, AND A. E. EWAN. **I. Report on soil experiment fields. II. Maintenance of fertility.** Kentucky Agric. Exp. Sta. Bull. 228: 89-131. 1920.—See Bot. Absts. 7, Entry 463.

284. RUSSELL, E. J. **Farming in the New Era.** [Rev. of (1) HARRIS, T. S. *The sugar beet in America.* xviii + 342 p., 32 pl. 1919. (2) FLETCHER, S. W. *Strawberry growing.* xxii + 325 p., 24 pl. Macmillan and Co.: London, 1917.] Nature 104: 593-594. 1920.

285. SEARS, F. C. **Personal experiences in fruit growing.** Rept. Vermont State Hortic. Soc. 17: 8-12. 1919.—The author discusses nine important factors in the producing, grading, and marketing of apples.—George P. Burns.

286. STARK, LLOYD C. **French fruit stocks.** Nation. Nurseryman 28³: 193. 1920.—A French syndicate has been organized which apparently controls a large part of the nursery stock grown in France. As a result the prices have increased to a prohibitive figure, despite the fact that there is a big crop this year of everything except plum, and this is more plentiful than last year. The respective prices per thousand for last year and this year are quoted for plums as \$39 and \$250, while this same stock formerly sold for \$7. In France pear stock can be purchased for \$19 per thousand, whereas the price quoted for export is \$70; in France quince stock, \$17, for export \$50. This situation is condemned, and it is stated that no stock will be purchased at these prices.—J. H. Gourley.

287. SUEMATSU, NAOJI, AND KIKUJI KUWATSUKA. **Studies on the varietal resistance of the peach to artificial inoculations with Gloeosporium laeticolor Berk.** Ann. Phytopath. Soc. Japan 1³: 1-12. 1920.

288. TAYLOR, C. R. **The auction method of distributing perishable food products.** Rept. Vermont State Hort. Soc. 17: 35-43. 1919.—The author describes the auction system, and shows that in cases of large production with a standardized commodity concentrated at one place it is the most efficient method of disposing of the product.—George P. Burns.

289. THORNER, H. **Cover crops, tillage, and commercial fertilizers.** Better Fruit 15²: 5, 20-22. Aug., 1920.—Experiments conducted for eight years in the Bitter Root Valley, Montana, with clover and peas as cover crops resulted in a substantial increase of the nitrogen content of the soil. Clover was sown in May and plowed under in the fall of the following year. Peas were also sown in May, but were plowed in the same fall. The first soil analysis was made after the experiment had been in progress for eight years. The nitrogen content of the first two feet of soil of clean cultivated plots was 1514 pounds per acre, while the plot sown to a cover crop of clover contained 3019 pounds per acre. Another plot sown to clover but cut each year, the hay being removed, showed a total nitrogen content of 2167 pounds. The plot on which peas were used as a cover crop had 2375 pounds of nitrogen per acre. The yield of fruit (apples) was highest on the clover plot on which the clover had been plowed under, and lowest on the clean cultivated plot. The writer believes that growing a leguminous cover crop is by far the best and most reasonable way of supplying the soil with humus and nitrogen.—A. E. Murneek.

290. WATSON, JOHN. **Aphis-resistant apple stocks.** Nation. Nurseryman 28³: 213-214. 1920.—The nurserymen of America must come to appreciate to a greater extent the importance of securing nursery stock which will be resistant to aphis injury. The influence of the stock upon the scion as well as the influence of the scion on the stock is recognized. For

instance, apple grafts of Bechtel's Crab and of Transcendant will compel a far better root system in two years than scions of Baldwin or Yellow Transparent on seedlings of exactly the same grade.—Of all aphid-resistant stocks the Northern Spy is the best. It is largely used in England, South Africa, Australia, and New Zealand. The suggestion is made that the time will probably come when California will use nothing else. In Australia, where woolly aphid is a prolific pest, the nurserymen have developed more than 25 varieties of resistant stocks, but Northern Spy furnishes fully 95 per cent of the apple stock used.—Methods for propagation of the stock are given, which are much like those used for Paradise and Doucin stocks.—*J. H. Gourley.*

291. WHITTEN, J. C. Transplanting deciduous fruit trees. *Better Fruit* 15³: 19-20. Sept., 1920.—Reprinted from Monthly Bulletin of the Dept. of Agr., State of California, vol. 9, No. 3, March, 1920.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

292. ANONYMOUS. *Awbury Arboretum*. Brooklyn Bot. Gard. Rec. 9: 23-24. Jan., 1920.—See Bot. Abstracts 7, Entry 77.

293. ANONYMOUS. *Koelreuteria paniculata*. *Nation. Nurseryman* 28³: 198. 1920.—A description of the tree is given, with conditions for growth, and a recommendation is made to extend its planting for lawns.—*J. H. Gourley.*

294. ANONYMOUS. *Oxydendrum arboreum*. *Nation. Nurseryman* 28³: 196. 1920.—A description of the sour-wood tree.—*J. H. Gourley.*

295. ANONYMOUS. Prospectus of courses offered by the Brooklyn Botanic Garden, 1920. Brooklyn Bot. Gard. Record 9: 1-18. Jan., 1920.

296. ANONYMOUS. Sweet pea flowering in the West Indies. *Agric. News* [Barbados] 19: 105. 1920.—All efforts of horticulturists in the West Indies to cultivate the American and European sweet peas (*Lathyrus odoratus*) have resulted in failure to produce flowers in spite of the vigorous vegetative growth made by the plant. Dr. S. C. HARLAND at last succeeded in obtaining a single flowering spike after 3 months' growth, from a pink variety of the Spencer type procured from the United States Department of Agriculture. The flowers were very small and without scent.—*J. S. Dash.*

297. ANONYMOUS. The climbing Polygonum. *Nation. Nurseryman* 28³: 200. 1920.—Notes are given regarding *P. Balduanum* and *P. Auberti*.—*J. H. Gourley.*

298. BREWSTER, A. A. Flowers of *Haemodorum*, blood root. *Australian Nat.* 4: 152. 1920.

299. BRITTON, N. L. About Paulownia trees. *Jour. New York Bot. Gard.* 21: 72-73. 1920.—Young *Paulownia* trees commonly grow 8-12 feet in a season and produce leaves as much as 30 inches in diameter. After 3 years they grow more slowly and become eventually 60 feet high or more.—*H. A. Gleason.*

300. CLARKSON, EDWARD HALE. The story of a fern garden. II. *Amer. Fern. Jour.* 10: 82-87. 1920.

301. COWELL, ARTHUR WESTCOTT. *Awbury Arboretum Address*. Bull. Geog. Soc. Philadelphia 17: 98-102. July 1919.—See Bot. Abstracts 7, Entr.

302. GLEASON, H. A. Organization of The American Iris Society. *Jour. New York Bot. Gard.* 21: 39-40. 1920.—The society was organized on Jan. 29, 1920, to promote the cultivation and further development of *Iris* in America.—*H. A. Gleason.*

303. HOWE, M. A. The 1920 dahlia border. Jour. New York Bot. Gard. 21: 138. 1920.
304. MEMMLER, HANS. Paphiopedilum Rothschildianum und die Kultur der übrigen mehrblütigen Frauenschuharten. [Paphiopedilum Rothschildianum and the culture of the other several-flowered ladyslippers.] Orchis 14: 17-21. 1920.—Short descriptions are given of *P. Rothschildianum*, its numerous hybrids, and closely related species. Cultural directions are included.—*E. B. Payson*.
305. MIETHE, E. Cypridium insigne Wall. und einige seiner Varietäten. [Cypridium insigne Wall. and some of its varieties.] Orchis 14: 4-7. 1920.
306. NASH, G. V. Hardy woody plants in The New York Botanical Garden. Jour. New York Bot. Gard. 18: 65-68, 86-90, 111-115, 137-140, 167-170, 189-192, 203-207, 217-224, 246-250, 259-263. IDEM. 19: 11-15, 58-62, 86-91, 108-111, 139-142, 167-171, 192-196, 222-225, 293-296, 315-318. 1918; 20: 11-14, 41-45, 67-70, 87-90, 107-111, 128-132, 144-148, 164-167, 221-225, 232-235. 1919; 21: 56-60, 74-77, 119-124. 1920.—A complete enumeration of the hardy woody plants cultivated in the botanical garden, with their location on the grounds and their natural distribution.—*H. A. Gleason*.
307. SANDS, W. N. Some tropical variegated-leaved plants. Agric. News [Barbados] 19: 154-155, 171. 1920.—The following are mentioned as the plants chiefly grown for the color effects of their foliage: varieties of *Dracaena*, *Acalypha*, *Codiaeum* (*Croton*), *Caladium*, *Graptophyllum*, *Coleus*, *Dieffenbachia*, *Agave*, *Aloe*, *Begonia*, *Maranta*, and *Tradescantia*, together with *Pandanus Veitchii*, *Panax Victoriae*, *Ficus elastica* var., *Furcraea cubensis*, *Aralia Guilfoylei*, *Sanchezia nobilis*, *Cissus discolor*, *Hibiscus rosa-sinensis*, var. *Cooperi*, *Phyllanthus nivosus*. Several of these are discussed in detail, information being given as to the appearance of the leaves, the causes of variations, and the inheritance of the phenomena. Several plants which are not well known in the West Indies but which are under cultivation at the John Innes Horticultural Institution, Surrey, England, are also dealt with.—*J. S. Dash*.
308. SCHLECHTER, R. Die Verbreitung und das Auftreten der Orchideen in Europa nebst Winken über ihre Kulture. [The distribution and occurrence of orchids in Europe together with hints as to their culture.] Orchis 13: 19-25, 35-40. 1919.—See Bot. Absts. 7, Entry 541.
309. SNODGRASS, M. D. Report of the work at Fairbanks Station. Rep. Alaska Agric. Exp. Sta. 1917: 57-72. Pl. 5-7. 1919.
310. WAUGH, F. A. How to improve home grounds. Rept. Vermont State Hort. Soc. 17: 62. 1919.
311. WOLTER, P. Die Anzucht der Odontoglossum aus Samen. [The raising of Odontoglossum from seed.] Orchis. 13: 12-13. 1919.—*Odontoglossum* seeds were sown in glasses on sterilized *Sphagnum* and *Polypodium* to which a mixed culture of root fungi had been added. More than a thousand seedlings were obtained which in the third year are beginning to bloom.—*E. B. Payson*.

VEGETABLE CULTURE

312. ANONYMOUS. Onion growing in Grenada. Agric. News [Barbados] 18: 374-375. 1919.—Experiments show that onions can be profitably grown. Two crops per annum may be obtained. The yield per acre, as calculated from the experiments, was 3.38 tons of marketable onions.—*J. S. Dash*.
313. ANONYMOUS. The storage of onion seed in the Tropics. Agric. News [Barbados] 18: 375. 1919.—Experiments carried out in Grenada have shown that onion seed can be successfully kept for at least nine months when placed in air-tight containers in the presence of calcium chloride.—*J. S. Dash*.

HORTICULTURE-PRODUCTS

314. FABRE, J. -HENRI. *Procédés modernes de vinification en Algérie et dans les pays chauds.* [Modern methods of wine making for Algeria and the warm regions.] 2 ed. 184 p. J. -Henri Fabre: Maison-Carré, 1920.

315. JONES, J. *Cacao production in Dominica.* Agric. News [Barbados] 19: 91. 1920.—Attention is drawn to the fact that owing to the losses of trees during the hurricanes of 1915 and 1916 (in the latter over 10,000 trees were lost on the estates and even more from the peasants plots) and to the large amount of cacao smuggled to the neighboring foreign islands where the product was in great demand, the figures of export given by the Customs Department are hardly an index of the production. These figures are: 1917, 3169 cwt.; 1918, 4239 cwt.; and 1919, 3214 cwt. for the months of January to November. The writer remarks that while the trees which survived the hurricane have returned to pre-hurricane production, little or no effort has been made to replace the trees destroyed.—J. S. Dash.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

316. ANDREWS, E. F. *Habits and habitats of the North American Resurrection Fern.* Torrey 20: 91-96. 1920.

317. ANONYMOUS. *Applied plant morphology.* [REV. OF: BARBER, C. A. *Studies in Indian sugar canes.* Mem. Dept. Agric. India Bot. Ser. 10: 39-153. June, 1919]. Nature 104: 578. 1920.—See Bot. Absts. 7, Entry 7.

318. BURNS, GEORGE P. *Eccentric growth and the formation of redwood in the main stem of conifers.* Vermont Agric. Exp. Sta. Bull. 219: 1-10. Pl. 4, 10 fig. 1920.—This bulletin is a discussion of the relative importance of compression and gravity as factors in the production of redwood in conifers, based on experimental work in the greenhouse and in the open on spruce and white pine. The author concludes that compression does not stimulate the cambium to rapid division to produce redwood. The pressure of mechanical forces did cause, in the white pine, a differentiation into summer wood and spring wood, but no redwood formation. The conclusion is, therefore, that the production of redwood is a morphogenic response of the tree to the stimulus of gravity.—B. F. Lutman.

319. CHEMIN, E. *Observations anatomiques et biologiques sur le genre "Lathraea."* [Anatomical and biological observations on the genus "Lathraea."] Ann. Sci. Nat. Bot. X, 2: 125-272. 1 pl., 88 fig. 1920.—A contribution to knowledge of parasitic plants. After reciting the generic and specific characters in *Lathraea*, recognizing the five species listed in Index Kewensis, the author presents observations on the two French species *L. clandestina* and *L. squamaria*, dealing with root, with development, penetration and feeding of haustorium, with leaves present as scales bearing glands (which, according to the author's hypothesis, function as excretory organs), and with germination. The author supposes that originally an accidental and partial parasitism caused adaptation to dark places, and that this led to complete disappearance of chlorophyll and to obligate parasitism.—J. P. Kelly.

320. CHURCH, MARGARET B. *Root contraction.* Plant World 22: 337-340. 1 fig. 1919.

321. GLÜCK, H. *Blatt-und blutenmorphologische Studien.* [Studies in the morphology of leaf and flower.] 284 p., 7 pl., 284 fig. Gustav Fischer: Jena, 1919.—A broad morphological survey of stipular structures in general, of intervaginal papillae and of the leaf sheath, with a resulting interpretation of the morphological nature of bracts and floral envelopes. The venation of these latter organs plays an important part in any study of their nature, and considerable emphasis is therefore placed upon it and upon the ontogenetic development of the structures investigated.—E. W. Sinnott.

322. GOEBEL, K. Die entfaltungsbewegungen der Pflanzen und deren teleologische Deutung. [The growth movements of plants and their teleological meaning.] 17 × 26 cm., vii + 483 p., 239 fig. Gustav Fischer: Jena, 1920.—This volume is in the nature of a supplement to the author's "Organographie" and is concerned with plant movements in general, both those which are strictly movements of growth and development and those which are part of the functional activity of organs. Among the subjects discussed are: the movements of jointed organs; the nutation of shoots; the unfolding of leaves and their orientation; developmental torsions and asymmetry; resupination in flowers; successional development; irritability in floral organs; the behaviour of sensitive plants and the "sleep" movements of plants. The author seeks an interpretation of all these movements from the point of view of their usefulness to the plant, and concludes that the common conception of these phenomena as adaptations is erroneous. He denies that teleology in any sense, either that of purposeful acquirement or that of Darwinian adaptation through natural selection, has been concerned with their origin, but believes that they have arisen fortuitously and when useful have been seized and preserved by the organisms.—*E. W. Sinnott.*

323. HAMILTON, A. A. Abnormal branching in a palm. Australian Nat. 4: 156-157. 1920.

324. HOLDEN, H. S. Observations on the anatomy of teratological seedlings. III. On the anatomy of some atypical seedlings of *Impatiens Roylei*, Walp. Ann. Botany 34: 321-344. 106 fig. 1920.—The anatomy of the normal seedlings of *Impatiens Roylei* and the modifications which it has undergone in a number of abnormal seedlings are fully described. The atypical seedlings are of two main kinds, the first being undoubtedly syncytious, and the second showing no macroscopic evidence of syncotyly. The members of the first group can be arranged in a graded series in which the syncotyly becomes more and more intimate. Its effects are (1) the suppression of the two lateral bundles of the normal cotyledon and of the root pole on the symphysis side, (2) the reduction and ultimate disappearance of the first epicotyledonary leaf, and (3) in extreme cases the modification of the leaves at the third node. The seedlings of the second group which show no macroscopic evidence of syncotyly may be either truly syncytious or heterocotytious, and the evidence in favor of both interpretations is mentioned.—*W. P. Thompson.*

325. JACCARD, P. Inversion de l'excentricité des branches produite expérimentalement. [The experimental inversion of the eccentricity of branches.] Rev. Gén. Bot. 32: 273-281. 2 pl., 1 fig. 1920.—See Bot. Absts. 7, Entry 431.

326. LECOMTE, HENRI. Sur les principaux caractères de structure des Bois. [The principal characters in wood structure.] Bull. Mus. Hist. Nat. Paris 26: 166-171. 1920.—A study of the dicotyledonous woods of Indo-China has been made in order to assist in the identification of specimens from that region. The structures of secretory tissues, vessels, woody parenchyma and medullary rays are reviewed, and their peculiarities in various genera indicated.—*E. B. Payson.*

327. LENOIR, M. Évolution du tissu vasculaire chez quelques plantules de dicotylédones. [Development of vascular tissue in certain dicotyledonous seedlings.] Ann. Sci. Nat. Bot. X. 2: 1-123. 91 fig. 1920.—Author deals with very young fibro-vascular bundles at their passage from root, where arrangement of xylem and phloem is alternate, to stem and cotyledon, where collateral disposition is found. He presents and criticises two theories on subject: (1) that which claims the splitting radially into two of the primary xylem masses of root ("redoublement"), and the turning through 180° ("torsion") of each half in passing up to become inner part of collateral bundle of stem or cotyledon; and (2) the theory of successive stages, which states that conducting apparatus of plant shows an ontogenetic series of stages—centric, excentric, alternate, intermediate, and collateral—and that there is not a real identity of root bundle and cotyledonary bundle. Author sets forth observations on species of *Veronica*, *Lamium*, and other genera, and concludes that no true radial

splitting occurs; that in all there is more or less of an inversion of the fibro-vascular bundle upon itself; that no absolute identity of cotyledonary and radicular bundles exists, but that always there are additions of recent tissues in higher parts. Passage from alternate to collateral arrangement follows two methods. A gradual differentiation of vessels occurs along certain lines, curved in cross-section, connecting the xylem and phloem poles. Considered longitudinally a progressive displacement of vessels combined with appearance of new elements in appropriate directions takes place.—*J. P. Kelly.*

328. MILBRAED, J. *Paraphyadanthé* Mildbr. nov. gen. Flacourt. Ein interessanter Fall von "Rhizanthie" aus Kamerun. [*Paraphyadanthé* Mildbr., a new genus of Flacourtiaceae. An interesting case of "rhizanthie" from Kamerun.] Notizbl. Bot. Gart. Berlin 7: 399-405. Fig. A-O. 1920.

329. NICOLAS, G. Biologie florale de quelques ombellifères Nord-Africaines. [Floral biology of some North African umbellifers.] Rev. Gén. Bot. 32: 230-234. 1920.—Andromonoecism, or the presence of staminate and hermaphrodite flowers on the same plant, is very rare in the plant kingdom as a whole, but is comparatively common in the Umbelliferae. Loew found this condition in more than forty out of sixty-six European species. Some species are staminate, hermaphrodite, and andromonoecious in different geographic regions. To the list of sixteen species stated by LOEW to be exclusively hermaphroditic in Europe, four North African species are added: *Ptychotis ammoides* Koch., *Daucus aureus* Desf., *Torilis neglecta* Roemer & Schultes, and *T. nodosa* Gaertn. The andromonoecious condition holds in *Scandix Pecten-Veneris* L., *Hippomarathrum pterochlaenum* Bossier, *Ferula communis* L., *F. sulcata* Desf., and *Daucus setifolius* Desf. In these forms the hermaphroditic flowers always occupy the summits of the primary and secondary axes, while the more numerous staminate flowers are either mixed with them or are grouped alone on the secondary and tertiary axes.—*L. W. Sharp.*

330. PRANKERD, T. L. On some new types of statocyte occurring in vascular plants. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 335. 1920.

331. RYDBERG, P. A. [Rev. of: HENRY, AUGUSTINE, AND MARGARET G. FLOOD. The Douglas Fir. Proc. Roy. Irish Acad. Sec. B. 35: 67-92. Pl. 12-14. 1920.] Torreya 20: 102-104. 1920.

332. SALISBURY, E. J. Monocotyledonous features of the Ranunculaceae with special reference to the floral structure. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 336. 1920.

333. SMALL, JAMES. The origin and development of the Compositae. xii + 334 p. William Wesley and Son: London, 1919.—A reprint of the author's series of papers under the same title which have appeared during the last two years in the New Phytologist. (See Bot. Absts. 2: 72, 73, 74, 75; 3: 1142; 5: 720, 721.)

334. SOUÈGES, RENÉ. Embryogénie des Oenothéracées. Développement de l'embryon chez l'*Oenothera biennis* L. [The embryogeny of the Oenotheraceae. The development of the embryo of *Oenothera biennis*.] Compt. Rend. Acad. Sci. Paris 170: 946-949. 11 fig. 1920.—The 4-celled stage resembles that of most angiosperms. The upper 2 cells give rise to the cotyledons and the hypocotyl. The middle cell develops very early into the hypophysis, and the lower to the few-celled suspensor.—*C. H. Farr.*

335. THOMPSON, JOHN McLEAN. The morphology of the stele of *Platyzoma microphyllum*. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 332-333. 1920.

336. VUILLEMIN, P. L'amphigonelle et la phylogénie des amentales. [The "amphigonelle" and the phylogeny of the Amentales.] Ann. Sci. Nat. Bot. X, 1: 139-200. 1919.—Author is adverse to use of word *flower* for precise scientific writing; *amphigonelle* is his term for type of

reproductive apparatus widespread in lower groups of Dicotyledons, especially in Amentales. He distinguishes three stages of evolution of reproductive apparatus or "gonelle:" (1) *Amphigonelle*, which represents lowest degree of differentiation among Dicotyledons, and is characterized by diffuseness, for axis is polycentric—i.e., with many centers of growth; (2) *Acrogonelle* with a concentration of parts making a monocentric axis; and (3) *Anthogonelle*, which is set off from preceding by development of corolla. The last corresponds best with popular conception of *flower*. Bound up with above ideas is author's theory of stem evolution—that there are two principal stages, the stage of the *stipe* with its *frondomes* and stage of the *caulome* with its *phyllomes*. The *amphigonelle* is considered stipular in character, as shown in polycentric axis; its receptacle is broken up into *gonoclines*, each of which builds a part of the *gonelle* called *gonelette*. The *amphigonelle* is one of the characteristics of Amentales; and the catkin, capitulum, or glomerulus are *amphigonelles* rather than flowers or inflorescences. Amentales afford opportunity to study modifications of *amphigonelle* and its transition to *acrogonelle*. Author devotes most of work to morphological analysis of class Amentales, applying above and other details of his conceptions.—In a second (smaller) portion he presents his ideas of the phylogeny of class, in which he includes the following orders: Juglandales, Salicales, Casuarinales, Cupuliferae, Myricales, Piperales, and Chloranthales.—James P. Kelly.

337. WINKLER, HANS. Verbreitung und Ursache der Parthenogenesis im Pflanzen- und Tierreiche. [The occurrence and causes of parthenogenesis throughout the animal and plant kingdoms.] vi + 231 p. Gustav Fischer: Jena, 1920.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

338. ANONYMOUS. **Sphagna**. Moss Exchange Club Ann. Rept. [York] 23: 205-210. 1918.—The species of *Sphagnum* listed number 33 and represent the specimens offered for exchange by the Club during 1917. Several of the species include named varieties and forms. Critical notes by J. A. W[HELDON] are interspersed throughout.—A. W. Evans.

339. ANONYMOUS. **True mosses**. Moss Exchange Club Ann. Rept. [York] 23: 210-214. 1918.—Under the "true mosses" only the Acrocarpi are included. The species listed number 65, and critical notes are furnished by R. N. M[ELDRUM], W. E. N[ICHOLSON], AND J. A. W[HELDON].—A. W. Evans.

340. ANONYMOUS. **Pleurocarpi**. Moss Exchange Club Ann. Rept. [York] 23: 214-217. 1918.—The pleurocarpous mosses listed number 33, and the critical notes included are by H. N. D[IXON], W. I[NGHAM], AND J. A. W[HELDON].—A. W. Evans.

341. ANONYMOUS. **Hepatics**. Moss Exchange Club Ann. Rept. [York] 23: 217-219. 1918.—The species listed include 5 *Ricciae*, 33 *Jungermanniales*, and 1 *Anthoceros*. *Lepidozia intermedia* Schiffn. is recognized as a valid species, although SCHIFFNER had proposed it provisionally. The critical notes are by H. H. K[NIGHT] AND S. M. M[ACVICAR].—A. W. Evans.

342. ANONYMOUS. **Synopsis of the European Sphagna [Corrections and additions]**. Moss Exchange Club Ann. Rept. [York] 23: 219-221. 1918.—The data here given are supplementary to J. A. W[HELDON]'S work, published under the above title. The "additions" relate to varieties and forms of 19 species of *Sphagnum*, all supposedly new to the British Isles. Two of these are varieties of *S. franconiae* Warnst., a species not included in earlier lists of British *Sphagna*.—A. W. Evans.

343. ANONYMOUS. **Sphagna**. Moss Exchange Club Ann. Rept. [York] 24: 229-234. 1919.—The species of *Sphagnum* listed number 26 and include numerous varieties and forms. As in the previous Annual Report many of the specimens cited are accompanied by critical remarks, signed "J. A. W[HELDON]."—A. W. Evans.

344. ANONYMOUS. **True mosses.** Moss Exchange Club Ann. Rept. [York] 24: 234-241. 1919.—The acrocarpous mosses listed number 96 and include 6 species from continental Europe and 1 each from New Zealand and Canada, the remaining species being all represented by British specimens. Critical notes by H. N. D[IXON], H. H. K[NIGHT], W. E. N[ICHOLSON], P. G. M. R[UODES], AND W. I[NGHAM] accompany the citations, one of the most important of these notes relating to *Dicranum Bonjeani* var. *alatum* Barnes.—A. W. Evans.

345. ANONYMOUS. **Pleurocarpi.** Moss Exchange Club Ann. Rept. [York] 24: 241-243. 1919.—Except for 1 species from Switzerland the 35 pleurocarpous mosses listed are all from the British Isles. *Hypnum fluitans* var. *atlanticum* Ren. and *H. uncinatum* var. *plumulosum* Schp. are discussed at some length by J. A. W[HELDON], and shorter notes by the same writer and by W. I[NGHAM] are included.—A. W. Evans.

346. ANONYMOUS. **Hepatics.** Moss Exchange Club Ann. Rept. [York] 24: 244-247. 1919.—The 66 species listed include 5 from Tasmania, 3 from continental Europe and 1 from Africa, the remainder being represented by British specimens. Notes by P. G. M. R[UODES], H. H. K[NIGHT], AND S. M. M[ACVICAR] accompany the citations, the note by the last having reference to the recently described *Herberta Hutchinsiae* (Gottsche) Evans.—A. W. Evans.

347. ANONYMOUS. **Sphagna.** Moss Exchange Club Ann. Rept. [York] 25: 257-259. 1920.—The *Sphagna* distributed during 1919 numbered 25 species, several of which were represented by numerous varieties and forms. One specimen came from Canada, the others from the British Isles. A few short critical notes by J. A. W[HELDON] are included in the report.—A. W. Evans.

348. ANONYMOUS. **True mosses.** Moss Exchange Club Ann. Rept. [York] 25: 259-264. 1920.—Both the Acrocarpi and the Pleurocarpi are here included under the "true mosses," 97 species in all being listed. Of the specimens cited 14 came from Scandinavia, 7 from other parts of continental Europe, 4 from Canada and the remainder from the British Isles. The notes accompanying the citations of specimens are by H. N. D[IXON], D. A. J[ONES], H. H. K[NIGHT], W. E. N[ICHOLSON], W. I[NGHAM], AND J. A. W[HELDON].—A. W. Evans.

349. ANONYMOUS. **Hepatics.** Moss Exchange Club Ann. Rept. [York] 25: 264-266. 1920.—Of the 46 species listed 10 came from continental Europe, the others from Great Britain. All except 3 are Jungermanniales. H. H. K[NIGHT] and D. A. J[ONES] have contributed a few critical remarks.—A. W. Evans.

350. BROTHERUS, V. F. **Contributions à la flore bryologique de l'Ecuador.** [Contributions to the moss flora of Ecuador.] Rev. Bryologique 47: 1-16. 1920.—The present report is based on a collection of mosses made in 1909 and 1910 by the late ABBÉ ALLIONI in the provinces of Oriente and Azuay, Ecuador. The majority of the specimens came from Oriente, a region heretofore unknown bryologically. In the first part of the report (which is to be continued) 95 species belonging to 19 families are listed with definite data regarding stations. The families most largely represented are the Neckeraceae with 25 species, the Dicranaceae and the Pottiaceae with 12 each. The following species, 20 in all, are described as new: *Barbula ecuadoriensis*, *B. hyalinobasis*, *B. linguacupes*, *Breutelia Allionii*, *B. brachyphylla*, *B. reclinata*, *Bryum Allionii*, *Campylopus tener*, *Fissidens Allionii*, *F. altolimbatus*, *Grimmia Allionii*, *Hyophila grossidens*, *Molendia subobtusifolia*, *Pilopogon macrocarpus*, *Pilotrichella Allionii*, *Pleurochaete ecuadoriensis*, *Porothamnium gracile*, *Syrhophodon macrophyllus*, *S. subrigidus*, and *S. subscaber*. The following represent new combinations: *Campylopus liliputanus* (C. Müll.) Broth. (*Pilopogon liliputanus* C. Müll.) and *Porotrichodendron superbum* (Tayl.) Broth. (*Leskea superba* Tayl.).—A. W. Evans.

351. LUISIER, A. **Les mousses de Madère.** [Mosses of Madeira.] Broteria, Ser. Bot. 18: 79-97. 1920.—This is the eighth article of a series previously noticed, which discusses completely the mosses of Madeira. The present installment covers the two families Sema-

tophyllaceae and Brachytheciaceae. Besides the usual data upon collections and local distribution, the author gives detailed notes upon the species or varieties listed below, all of which are of restricted occurrence or little known. These species are: *Homalothecium sericeum* (L.) B. & S. var. *Mandoni* (Mitt.) R. & C., *Brachythecium Cardoti* Wint., *Oxyrrhynchium orotavense* R. & C., *Rhynchostegiella Bourgeana* (Mitt.) Broth., *Rh. surrecta* (Mitt.) Broth., and *Rhynchostegium Winteri* Card. [See Bot. Absts. 6, Entry 156.]—*E. B. Chamberlain.*

352. PEARSON, WM. HY. *Apolozia Pendletonii* Pearson, n. sp. *Bryologist* 23: 50-52. *Pl. 2.* 1920.—This new hepatic is related to *Jungermannia cordifolia* Hook. It was collected at Sisson, California.—*E. B. Chamberlain.*

353. WHELDON, J. A. Recent new *Sphagnum* records. Moss Exchange Club Ann. Rept. [York] 24: 247-252. 1919.—The specimens cited represent new county records for Great Britain. Thirty-four species of *Sphagnum* are listed, including numerous varieties and forms, some of which are here reported for the first time from the British Isles.—*A. W. Evans.*

354. WILLIAMS, R. S. *Grimmia* (Guembelia) *brevirostris*, sp. nov. *Bryologist* 23: 52-53. *Pl. 3.* 1920.—A detailed description of a new species of moss from Plumas County, California.—*E. B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

FUNGI

355. ANONYMOUS. [Rev. of: BLANC, GEORGES AND GABRIEL BRUN. [A further case of black-grain mycetoma (Madura Foot) in Tunisia.] *Bull. Soc. Path. Exotique.* Dec. 10, 1919.] *Jour. Trop. Med. and Hygiene* 23: 43-44. 1920.—Reports the seventh case found in Tunisia of Madura Foot. This is a mycetoma. The cause was found to be a fungus closely related to *Madurella tozeuri* Nicolle and Pinoy but differing in several characters and named accordingly *M. tabarkae*.—*E. A. Bessey.*

356. ANONYMOUS. [Rev. of: SMITH, THEOBALD. *Mycosis of the bovine foetal membranes due to a mould of the genus Mucor.* *Jour. Exp. Med.* 31: 115. 1920.] *Jour. Comp. Path. and Therap.* 33: 60-64. 1920.—A description of infection of foetal membranes of cattle due to a species of *Mucor* closely related to *M. rhizopodiformis*. On inoculation into rabbits, it caused their death.—*E. A. Bessey.*

357. ANONYMOUS. *The species concept among fungi.* [Rev. of: BRIERLY, W. B.—*Trans. British Mycol. Soc.* 4. Sept., 1919.] *Nature* 104: 708. 1920.—The author protests against specific descriptions based on growths as found in nature, especially for species on cultivated plants. The only exact method is by quantitative data derived from cultural treatment under standardized physico-chemical conditions.—*O. A. Stevens.*

358. BRIERLY, WILLIAM B. *The fungal species.* [Abstract.] *Rept. British Assoc. Sci.* 1919: 340-341. 1920.

359. CASTELLANI, ALDO. *The etiology of thrush.* *Jour. Trop. Med. and Hygiene* 23: 17-22. 1 *pl.* 1920.—The author claims that instead of the one fungus, *Oidium albicans* Robin, many fungi in the genera *Monilia*, *Oidium*, *Hemispora*, *Willia*, *Endomyces*, and *Saccharomyces* may cause this disease. The generic differences are given. The clinical varieties of thrush are described, with the causal organism for each.—*E. A. Bessey.*

360. CASTELLANI, ALDO. **Milroy lectures on the higher fungi in relation to human pathology. (Lecture I.)** Jour. Trop. Med. and Hygiene 23: 101-110. *Fig. 1-9.* 1920.—A brief survey is given of the discovery of fungi pathogenic to man. The general classification of fungi is given and in particular that of the families containing such pathogens. Notes are given on physiology and on the use of sets of fungi for biochemical analysis.—*E. A. Bessey.*

361. CASTELLANI, ALDO. **Milroy lectures on the higher fungi in relation to human pathology. (Lecture II.)** Jour. Trop. Med. and Hygiene 23: 117-125. *10 fig.* 1920.—The author discusses thrush, broncho-mycoses, tonsillo-mycoses, certain mycoses of the nervous system and organs of special sense, and certain mycoses of the urogenital system. A key is given to the physiological determination of the pathogenic *Monilia* species, showing their reaction to various carbohydrates, gelatin, litmus milk, etc.—*E. A. Bessey.*

362. CASTELLANI, ALDO. **Milroy lectures on the higher fungi in relation to human pathology. (Lecture III.)** Jour. Trop. Med. and Hygiene 23: 133-138. *2 pl., 6 fig.* 1920.—The subjects treated are trichomycoses and dermatomycoses. The former affect only the hairs and may be caused by species of *Aspergillus*, *Penicillium* and *Nocardia*. The true dermatomycoses are very numerous and caused by a great variety of fungi, which are described in some detail.—*E. A. Bessey.*

363. CHALMERS, ALBERT J., AND NORMAN MACDONALD. **Bronchomoniliasis in the Anglo-Egyptian Sudan and Egypt.** Jour. Trop. Med. and Hygiene 23: 1-7. *1 pl.* 1920.—The article discusses several types of bronchomycosis and the causal fungi. The latter were grown in culture and identified by the aid of cultural as well as morphological characteristics. The species concerned were *Monilia krusei*, *M. pinoyi*, and *M. pseudoguilliermondii*. A discussion is given of the nomenclatorial history of the name *Monilia*.—*E. A. Bessey.*

364. CHIOVENDA, E. **Nuova localita italiana per il Myriostoma coliliforme (Dichs.) Corda. [New station for Myriostoma coliliforme in Italy.]** Nuova Gior. Bot. Ital., Nuova Ser. 27: 7-11. 1920.—*Myriostoma coliliforme* was collected in Ossola (Piemont) for the first time. The fungus was found growing in close association with the roots of *Polygonum persicaria*, forming with the latter an endotrophic relationship. Only once before, in 1902, has this fungus been observed in Italy.—*Ernst Artschwager.*

365. GARRETT, A. O. **Some unique rusts.** Utah Acad. Sci. 1: 132-136. 1918.—Paper presented to the Academy, April, 1915.—Review of recent work on life-history studies.—*D. Reddick.*

366. HEMMI, TAKEWO. **Kurze Mitteilung über drei Falle von Anthraknose auf Pflanzen. [Short report on three cases of anthracnose of plants.]** Ann. Phytopath. Soc. Japan 13: 13-21. *1 pl., 5 fig.* 1920.

367. KUNKEL, L. O. **Further data on the orange rusts of Rubus.** Jour. Agric. Res. 19: 501-512. *Pl. D (colored) and 92-94.* 1920.—Collections were made of the long-cycled rust, *Gymnoconia interstitialis*, and the short-cycled rust occurring on *Rubus* spp. about Washington, D. C. A study of these specimens has shown that the rust on the black raspberry is always long cycled while the rust on the blackberry and dewberry is always short cycled. Spores of the two rusts were germinated on water and Beyerinck agar at temperatures from 5° to 30°C. Spores taken from blackberry leaves always produced promycelia, while those from black raspberry leaves produced long germ tubes. Additional morphological differences in the two rusts were observed. The spores of the short-cycled rust are small, angular, and in mass cadmium orange, while the spores of *Gymnoconia* are larger, more regular, and in mass xanthine yellow. The author considers that a genetic relationship exists between the two rusts, since spores of the long-cycled species at times produce promycelia bearing sporidia. The occurrence of a suppressed short cycle in *Gymnoconia* leads him to believe that long-cycled rusts are the more primitive.—*W. H. Burkholder.*

368. NAMYSLOWSKI, B. *État actuel des recherches sur les phénomènes de la sexualité des Mucorinées.* [The status of researches on sexuality in the Mucorineae.] *Rev. Gén. Bot.* 32: 193-215. 9 fig. 1920.—A summary of the results of experimental researches on reproduction and hybridization in this group of fungi. A bibliography of 34 titles is appended.—*L. W. Sharp.*

369. RICK, J. *Contributio ad monographiam Agaricearum brasiliensium.* [Contribution toward a monograph of Brazilian agarics.] *Broteria* (Ser. Bot.) 18: 48-63. 1920.—This list contains 106 species and a few varieties, without citation of authorities except for new species, apparently all from the province of Rio Grande do Sul. In case of species already described, only a line or two of notes appear. In case of new species the descriptions are more complete. Of these the author says: "In this contribution many species are described whose identity with European species is quite probable, but not certain. I have therefore given a full description and a new name. At the same time I have indicated the old species with which the new is perchance identical." New species are proposed in *Lepiota*, *Hypholoma*, *Armillaria*, *Tricholoma*, *Collybia*, *Pluteolus*, *Eccilia*, *Clitopilus*, *Claudopus*, *Inocybe*, *Nauconia*, *Galera*, *Tubaria*, *Pilosace*, *Psilocybe*, and *Hygrophorus*. [See Bot. Absts. 6, Entry 204.]—*E. B. Chamberlain.*

370. THAXTER, ROLAND. *New Dimorphomyceteae.* *Proc. Amer. Acad. Arts and Sci.* 55: 211-282. 1920.—The author discusses in general the unisexual forms of the Laboulbeniales and in particular the distinction between the genera *Dimeromyces* and *Dimorphomyces*. *Polyandromyces* is described as a new genus with one species and a variety as the known representatives. Eleven new species of *Dimeromyces* and fifty-one new species of *Dimorphomyces* are described.—*E. B. Payson.*

LICHENS

371. MOREAU, F. (M. ET MME.) *Recherches sur les lichens de la famille des Peltigéracées.* [Researches on lichens of the family Peltigeraceae.] *Ann. Sci. Nat. Bot.* X, 1: 29-138. 13 pl., 23 fig. 1919.—Authors are especially interested in reproduction of fungus of the lichen and in morphological influence of one symbiont on other. Their presentation is in three parts: (1) the fungus, (2) the alga, and (3) the alga-fungus complex. Authors emphasize mycelium as constituting colorless part of lichen. Underground or substratal mycelium is typical and generally neglected by students; authors call attention to occasional fusions among underground hyphae and to evidence for method of formation of septa. Typical mycelium appears also in the gonidial layer. Each cell is here described as having a single nucleus and metachromatic granules. In considering medullary region and pseudoparenchymatous region (plectenchyma), character of walls is emphasized. Authors refer to two kinds of reproductive bodies set free by *Peltigeraceae*; viz., spermatids and ascospores. They note that status of spermatids is uncertain. They found spermatids only in genus *Nephromium*, but did not make out fate of spermatids after being set free. Their studies showed that ascospore formation proceeds in absence of spermatids, and they deny to latter gametic functions. Ascospores an uncertain means of maintaining species, since a proper alga must be met when spore germinates. Soredia are certain to lead to new lichens. A consideration is next presented of beliefs of STAHL and BACHMANN, of FÜNFSTÜCK, and of DANGEARD concerning occurrence of sexual phenomena at formation of apothecia in fungi, and hypothesis of DANGEARD is favored.—Authors point out that the kind of alga (gonidia) whether of *Cyanophyceae* or *Chlorophyceae*, determines sub-generic groups in each of three genera of *Peltigeraceae*. Chlorophyceous *Peltigeraceae* may enclose *Cyanophyceae* in cephalodia. The authors point out necessity of pure culture methods in study of lichen algae.—Mutual relationships of alga and fungus studied in following exceptional formations which begin with algae in unusual positions: (a) tubercles resembling very large soredia on lower surface of thallus (displaced gonidia cause neighboring hyphae to assume special character); (b) soredial aberrations; (c) foliar ramifications of thallus, and (d) cephalodia formation due to action on hyphae of foreign alga.—Desirable further lines of study are mapped out at close.—*James P. Kelly.*

372. RIDDLE, L. W. Two publications on tropical American lichens. [Rev. of: (1) DE LESDAIN, BOULY. *Lichens de Mexique (États de Puebla et du Michoacan)* recueillis par le Frère Arsène Brouard. Brochure. *Pl. 1-31*. 1914. (2) WAINIO, EDVARD. *Additamenta ad Lichenographiam Antillarum illustrandam*. Ann. Acad. Sci. Fennicae Ser. A. 6: pt. 7. 1915.] *Bryologist* 23: 60-61. 1920.—The reviewer calls attention to these two publications, which contains many descriptions of new species, since neither seems likely to have a wide distribution. That upon Mexican lichens is a wholly independent publication; the other publication, reviewer states, is received in America only at the Smithsonian Institution.—*E. B. Chamberlain*.

BACTERIA

373. BOKURA, UMEÑOJO. A new bacterial disease of Gypsy-moth caterpillars. Ann. Phytopath. Soc. Japan 1³: 34-55. 1920.

374. CAUDA, A. Gruppi vegetali fissatori di azoto libero. [Plant groups that fix free nitrogen.] *Nuovo Gior. Bot. Ital.* 26: 169-178. 1919.—See Bot. Absts. 6, Entry 846.

375. GENTNER, G. Eine Bakteriose der Gerste. [A bacteriosis of barley.] *Centralbl. Bakt.* 50²: 428-441. 1920. [From Absts. Bact. 4: 292. 1920.]

376. PAILLOT, A. Sur le polymorphisme des Bactéries. [The polymorphism of bacteria.] *Compt. Rend. Acad. Sci. Paris* 170: 905-906. 2 fig. 1920.—Two bacilli which cause disease in caterpillars are described. When in the caterpillar they present various forms. It is suggested that polymorphism may in some cases be due to the effect of the tissues or liquids of the living host.—*C. N. and W. K. Farr*.

377. PETERSON, W. H., AND E. B. FRED. The fermentation of glucose, galactose, and mannose by *Lactobacillus pentoaceticus*. n. sp. *Jour. Biol. Chem.* 42: 273-287. 1920.—See Bot. Absts. 6, Entry 1338.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

378. ADAMI, J. G. Medical contributions to the study of evolution. 8vo, 372 p. Macmillan and Co.: London, 1920. Price, \$7.25.

379. ANONYMOUS. Gymnospermic history. [Rev. of: SEWARD, A. C. *Fossil Plants: A text-book for students of botany and geology*. Vol. 4, Ginkgoales, Coniferales, Gnetales. xvi + 543 p. University Press: Cambridge, 1919.] *Nature* 105: 97-93. 1920. It is disappointing but perhaps not surprising that the work closes with this group. (See Bot. Absts. 3, Entry 2517.)—*O. A. Stevens*.

380. ANONYMOUS. [Rev. of: WIELAND, G. R. *Classification of Cycadophyta*. Amer. Jour. Sci. 47: 391-406. 1919. (See Bot. Absts. 3, Entry 1620.)] *Nature* 104: 509-510. 1920.

381. [B., F. O.] The origin of plant life on land. [Rev. of: CHURCH, A. H. *Thalassio-phyta and the subaerial transmigration*. Bot. Mem. No. 3. 95 p. Oxford Univ. Press: London, 1919.] *Nature* 104: 624. 1920.—A real contribution full of originality and of interesting though bluff criticisms. The cautious philosopher would probably prefer greater elasticity of the thesis. Omits reference to the important discoveries of Lower Devonian fossils in the Rhynie-Chert and to question of transference of the tetral division in the course of descent to a fresh position in the life cycle.—*O. A. Stevens*.

382. BERRY, EDWARD W. **Fossil plants from the late Cretaceous of Tennessee.** Proc. Nat. Acad. Sci. [U. S. A.] 6: 333-334. 1920.—The Gulf Coastal Plain presents a comparatively complete paleobotanical record from the Cretaceous to the present. The two large gaps have been the late Upper Cretaceous and the Miocene. In 1919, in western Tennessee, Dr. Bruce Wade discovered abundant material in clay lenses of the Ripley formation—the latest Cretaceous of the region. Remains of 124 species (86 new) have been identified. The species are referred to 62 genera (30 extinct), 38 families, and 25 orders; 5 ferns, 6 gymnosperms, 7 monocotyledons, and 105 dicotyledons are included. "A complete account . . . will be published by the U. S. Geological Survey."—Howard B. Frost.

383. BERRY, EDWARD W. **Fossil plants.** [Rev. of: SEWARD, A. C. **Fossil plants.** Vol. IV. Cambridge Univ. Press: Cambridge, 1919.] Plant World 22: 341-342. 1919. "On the whole it seems to the reviewer that Professor Seward has performed a difficult task about as well as could be expected, and despite their obvious shortcomings, which have been freely criticised, these four volumes are a mine of information for the student interested in the floras of the past."—(Author's summary.)

384. BERRY, EDWARD W. **New specific name.** Torreyia 20: 101. 1920.—*Inga oligocaenica* Berry (Bull. U. S. Nat. Mus. 103: 32. 1918.) from the Oligocene of the Canal Zone is antedated by *Inga oligocaenica* Engelhardt (1898), from the Oligocene of Bohemia. The name *Inga culebrana* is accordingly proposed.—J. C. Nelson.

385. BERRY, E. W. **The ancestors of the sequoias.** Sci. Amer. Monthly 2: 207-208. 1920.—A reprint of an article which appeared in a recent number of Natural History. [See also Bot. Absts. 6, Entry 793.]—E. W. Berry.

386. BERRY, E. W. **The teaching of paleobotany.** Bull. Geol. Soc. Amer. 31: 389-392. 1920.—Outlines the content of a university course in paleobotany.—E. W. Berry.

387. BERRY, E. W. **The age of the Dakota flora.** Amer. Jour. Sci. 50: 387-390. 1920.—Discusses the age of the flora found in the Dakota sandstone of the western United States and shows that it cannot be Lower Cretaceous in age. The thesis is maintained that the Dakota sandstone is intimately associated with the Upper Cretaceous marine transgression of the Benton and is probably Turonian in age.—E. W. Berry.

388. CARPENTIER, A. **Contribution a l'étude des fructifications du Culm de Mouzeil (Loire-Inférieure).** [Contribution to the study of the fructifications from the Culm of Mouzeil.] Rev. Gén. Bot. 32: 337-350. 2 pl., 5 figs. 1920.—The basin of the Basse-Loire consists of two SE-NW synclines, known respectively by the names of Ancenis and Teillé-Mouzeil. Fossil plants of this region were described by Brongniart, but the fructifications of the Pteridospermae were made known chiefly by Grand'Eury and Bureau. The author has studied further the imprints of fructifications found here.—On the whole the Culm flora is less rich in genera and species than the Westphalian flora of the coal basin of Valenciennes. Among the most common impressions are those of *Sphenopteris Dubuissoni*, *S. elegans*, and *S. dissectum* (Brongt.). The Neuropterideae are rare: the genus *Neuropteris* is represented only by a few fragments of *N. antecedens* and *N. Schlehani*. The Lepidodendreae, including *Lepidodendron lycopodioides*, *Lepidophloios laricinus*, and *Ulodendron*, are fairly common.—Descriptions are given of the following seeds, with or without cupules: *Lagenospermum tenuifolium* Nathorst g., (*E. Bureau* sp.), associated with *Neuropteris antecedens* Stur and a *Sphenopteris*; *L. crassum* n. sp., associated with *Sphenopteris Dubuissoni* Brongt.; *L. inflatum* n. sp., possibly representing the escaped seeds of the cupule known as *L. crassum*; *L. aff. nitidulum* (Heer) Nathorst, associated with *Sphenopteris dissectum* and one other species; *L. sp.*; *Carpolithus* L. (cf. *Rhabdocarpus turbinatus*) E. Bureau sp.; *C. sp.* Three types of microsporangia are described: *Telangium* sp., associated with *Sphenopteris Dubuissoni*; *Pterispermothera* n. gen.; Cf. *Diplothea* (*D. stellata* Kidston). Two uncertain impressions, one of them known as *Guilielmites*, are also mentioned.—L. W. Sharp.

389. CHANEY, RALPH W. *The flora of the Eagle Creek formation.* Cont. Walker Mus. 25: 115-182. Pl. 5-22. 1920.—The paucity of described fossil floras from the Pacific coast region renders this an important contribution. The Eagle Creek flora, as described in this contribution, comprises 72 species, of which 38 are described as new and referred to the genera *Equisetum* (?), *Picea* (?), *Pinus*, *Cyperacites*, *Sabalites*, *Smilax*, *Phyllites*, *Populus*, *Myrica*, *Hicoria*, *Juglans*, *Alnus*, *Betula*, *Corylus*, *Castanea* (?), *Fagus* (?), *Quercus*, *Ulmus*, *Liriodendron*, *Magnolia*, *Lavrophyllum*, *Liquidambar*, *Crataegus*, *Prunus*, *Cercis*, *Leguminosites*, *Acer*, *Tilia*, *Nyssa*, *Fraxinus* (?), and *Carpolithus*. These all appear to be well founded except the *Liriodendron*. The local sections where the fossils were found along the present Columbia River gorge, the composition, physical environment, ecology and correlation of the flora are fully and satisfactorily discussed.—The Eagle Creek formation is entirely volcanic in origin and stream laid. It is considered, on the basis of the intermediate character of the flora between known upper Eocene and Miocene floras, to be of Oligocene age. The flora, which is largely dicotyledonous, shows a striking resemblance to the mixed hardwood flora of the eastern United States—this resemblance extending to even the relative representation of the families, the only departures being a shortage of *Salicaceae* and *Rosaceae* and an excess of *Fagaceae* and *Hamamelidaceae*. Oaks are the most abundant forms, both individually and specifically. Maples and elms are also prominent elements. The flora is considered to represent two principal distinct ecological types; namely, xerophytes that are thought to have grown on the water poor ridges and uplands, and the contemporaneous mesophytes of the well-watered valley bottom and sides.—E. W. Berry.

390. DE LA VAULX, R., AND P. MARTY, avec introduction de PH. GLANGEAUD. *Nouvelles recherches sur la flore fossile des environs de Varennes (Puy-de-Dôme).* [New researches on the fossil flora of the vicinity of Varennes.] Rev. Gén. Bot. 32: 282-300, 327-336, 351-368. 3 pl., 2 fig. 1920.—A study of the fossil flora of three fossiliferous beds in one of the volcanic regions of France, based on a critical examination of the material described by BOULAY (Flore Pliocène du Mont-Dore, Paris 1872) and on new collections. The paper is prefaced by a brief account of the stratigraphy of the region by PH. GLANGEAUD, who agrees with BOULAY in assigning the beds in question to the upper Miocene or lower Pliocene. The list of fossil trees, shrubs, and herbs now reported from this locality comprises 47 forms representing 23 families; 37 of them have been specifically determined. The following 14 are newly discovered by the authors: *Ginkgo biloba* Kämpf., *Sparganium* sp., *Celtis Japeti* Ung., *Lauris nobilis* L., *Carya minor* Sap. et Mar., *Paeonia mouton* Sims., *Myriophyllitis* sp., *Cercis siliquastrum* L., *Raphiolepis indica* Lindl., *Bumelia Rieufi* Marty, *Fraxinus oregona* Nutt., *Ilex decidua* Walt., *Ilex balcarica* Desf., and *Rosa Glangeaudi* Marty. A list of about 50 species of diatoms is also included.—After a discussion of the palaeontological and geological evidence the authors conclude that the fossil flora of Varennes was buried during the Mio-Pliocene in the sediments of a lake into which volcanic ashes were thrown. This flora was continental, montane, and temperate, less than one-tenth of the species being sub-tropical. The mean temperature in this region during the Mio-Pliocene was probably from 12° to 14°C. Since that time some of the elements of the flora have migrated 5 geographical degrees southward.—Bibliography of 67 titles.—L. W. Sharp.

391. GALIPPE, V. *Recherches sur la résistance des microzymas à l'action du temps et sur leur survivance dans l'ambre.* [The longevity of microzymas and its survival in amber.] Compt. Rend. Acad. Sci. Paris 170: 856-858. 1920.—A microscopic examination of amber after dissolving in ether reveals the presence of microzymas and of ovoid and rod-shaped bacilli.—C. N. and W. K. Farr.

392. LULL, R. S. *Organic evolution.* 8vo, 729 p. The Macmillan Co.: New York, 1920. Price, \$3.25.

393. MACFARLAND, J. M. *The causes and course of organic evolution.* 8vo, 875 p. The Macmillan Co.: New York, 1920. Price, \$4.00.

394. METCALF, MAYNARD M. Upon an important method of studying problems of relationship and of geographical distribution. Proc. Nat. Acad. Sci. [U. S. A.] 6: 432-433. 1920.—A family of "frogs," the Leptodactylidae, occurs in tropical and south-temperate America, and elsewhere only in Australia and Tasmania. This fact has been explained as a result of former land connection or as a result of convergent or parallel evolution. In both continents, however, the Leptodactylidae have parasites of the genus *Zelleriella*, "and the Australian *Zelleriella*s so closely resemble the American forms that it is difficult to separate them specifically." Since it is extremely improbable that both host and parasite have evolved so similarly on distant continents, the hypothesis of former land connection is held to be definitely confirmed. This procedure of considering together the distribution of host and parasite is strongly recommended, as promising definite solution of various problems of phylogeny, migration, etc., with both animals and plants.—Howard B. Frost.

395. T., E. N. Botany at the British Association. Nature 104: 520-521. 1920.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

GENERAL

396. LINHART, G. A. A new and simplified method for the statistical interpretation of biometrical data. Univ. California Publ. Agric. Sci. 4: 159-181. 12 fig. 1920.—Describes graphic methods for determining the values of k and h in the fundamental equation,

$$y = ke^{-h^2x^2} \dots\dots\dots (1)$$

When $x = 0$, y will equal k . Therefore k may be defined as the probability of error zero and as the largest number of measurements of a given set having the same numerical value. Substitution of y_0 for k gives

$$\frac{y}{y_0} = e^{-h^2x^2} \dots\dots\dots (2)$$

By use of logarithms this may be transformed into the linear equation,

$$\log \left(2.303 \log \frac{y_0}{y} \right) = 2 \log x + 2 \log h \dots\dots\dots (3)$$

or

$$\log \left(\log \frac{y}{y_0} \right) = 2 \log x + 2 \log h - 0.3623 \dots\dots\dots (4)$$

Let $K = 2 \log h - 0.3623$, then

$$\log \left(\log \frac{y_0}{y} \right) = 2 \log x + K \dots\dots\dots (5)$$

This will be recognized as the equation to a straight line having a slope of 2 and intercept K , when $\log \left(\log \frac{y_0}{y} \right)$ is plotted as ordinate and $\log x$ as abscissa. The value of K being thus easily determined the value of h , the index of precision, may be calculated from

$$K + 2 \log h - 0.3623$$

and is

$$h = (10)^{\frac{K + 0.3623}{2}} \dots\dots\dots (6)$$

The value of hx corresponding to the integral value 0.5 (*vide* probability integral table) is 0.4769. Then

$$x = 0.4769 (10) - \frac{K + 0.3623}{2} \dots\dots\dots (7)$$

which gives the probable error of a single observation. The probable error of the mean is equal to the probable error of one observation divided by the square root of the total number of observations,

$$x_o = \frac{x}{\sqrt{n}} = \frac{0.4769}{\sqrt{n}} (10) - \frac{K + 0.3623}{2} \dots\dots\dots (8)$$

In the case of skew frequency distributions the above equations do not strictly apply because of a preponderance of either positive or negative errors. For such cases the equation,

$$\frac{y}{y} = e^{-h^2 \left(\log \frac{m}{m_o} \right)^2} \dots\dots\dots (9)$$

is proposed. Here m represents the numerical value of any measurement and m_o the value of the geometric mean. This may be transformed into the equation,

$$\log \frac{y_o}{y} = 2.303 h^2 \left(\log \frac{m}{m_o} \right)^2 \dots\dots\dots (10)$$

or

$$\log \frac{y_o}{y} = K \left(\log \frac{m}{m_o} \right)^2 \dots\dots\dots (11)$$

Numerous examples of the use of the equations are given, in which the values obtained are compared with those computed by other methods.—*H. S. Reed.*

DIFFUSION, PERMEABILITY

397. PRIESTLEY, J. H. Root pressure. [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 337. 1920.

WATER RELATIONS

398. HARRIS, F. S. The effect of soil moisture on the morphology of certain plants. [Abstract.] Utah Acad. Sci. 1: 65. 1918.

399. LIVINGSTON, BURTON E., AND RICHIRO KOKETSU. The water-supplying power of the soil as related to the wilting of plants. Soil Sci. 9: 469-485. 1920.—Plants of *Coleus blumei* and *Triticum sativum* grown in 12 mixtures of varying amounts of glass sand, clay loam, and humus, were allowed to wilt until permanent wilting was evident. Dry, unglazed porcelain cones ("soil points") were then thrust into the soil and the amount of water which they absorbed in a given length of time ("water-supplying" power of soil) was determined by removing and weighing. This amount for a 2 hour period was from 0.04-0.11 g. The average value was the same for both plants and practically the same for all 12 soils.—*W. J. Robbins.*

400. ZELLER, S. M. Humidity in relation to moisture imbibition by wood and to spore germination on wood. Ann. Missouri Bot. Gard. 7: 51-74. 1 pl., 5 fig. 1920.—The moisture contents of wood at various atmospheric humidities are presented, the temperature being held at 25°C. Graphs are given to illustrate the relation between water content and humidity, for sap and heart-wood of both longleaf and shortleaf pine. By testing at various humidities the moisture content of any one species of wood, it was possible to approximate the fiber-saturation point. The moisture-humidity curves of highly resinous samples illustrate the

water-proofing effect of resin—especially above 50 per cent humidity. The germination curve for spores of *Lenzites saepiaria* illustrates the fact that spore germination is greatly accelerated when the atmospheric humidity is high enough to maintain fiber saturation of the wood.—A humidor for maintaining constant humidity and temperature is described. It is provided with a dew-point apparatus for the determination of humidity, and a weighing device by means of which the samples can be weighed without opening the humidity chamber.—*S. M. Zeller.*

MINERAL NUTRIENTS

401. BOTTOMLEY, W. B. The growth of *Lemna* plants in mineral solutions and in their natural medium. *Ann. Botany* 34: 345-352. 1920.—*Lemna major* and *Lemna minor* cannot grow normally in Knop's or Detmer's solution, but the addition of certain organic substances to these solutions permits rapid and healthy growth. These organic substances essential to the metabolism of the plants are to be found in the water of the ponds in which the plants normally grow, and maintain the plants in health, although lack of sufficient quantities of nitrates and phosphates under these conditions acts as a limiting factor, retarding their rate of multiplication.—*G. M. Armstrong.*

402. DUGGAR, B. M. Hydrogen ion concentration and the composition of nutrient solutions in relation to the growth of seed plants. *Ann. Missouri Bot. Gard.* 7: 1-50. 7 fig. 1920.—For several years the author has been examining the effect of the reaction of the medium on growth in certain physiologically balanced nutrient solutions and has secured many data concerning the extent of change of the P_H value of the solution in which the plants have grown, as well as concerning growth relations with the variations in active acidity. Thus in this report of experimental work particular reference is not made to the proportions of the different salts involved in the nutrient solutions except as they may influence the active acidity. For this report four solutions were used, as follows: *Solution A* was a slight modification of Shive's solution, having the following partial volume-molecular proportions— KH_2PO_4 , 0.0180; $Ca(NO_3)_2$, 0.0052; $MgSO_4$, 0.0150; and "soluble ferric phosphate," 0.0044 gm. per liter. *Solution B* was an extreme modification of the Crone solution, having the following proportions of salts— KNO_3 , 0.00495; $CaSO_4$, 0.000726; $MgSO_4$, 0.000526; and "soluble iron phosphate," 0.125 gm. per liter; this is a four-salt solution having a higher proportion of iron than the usual nutrient solution. *Solution C* was the Livingston and Tottigham solution, modified by the addition of "soluble ferric phosphate" as in *Solution A*— KNO_3 , 0.0216; $Ca(H_2PO_4)_2$, 0.0026; and $MgSO_4$, 0.0150. It is assumed that the osmotic value of solutions *A* and *C* is approximately that of Shive's solution—1.75 atmospheres—while that of *Solution B* is much less.—The culture methods employed were essentially those described before. Seedlings of corn, field peas, and wheat were used. For the determination of active acidity the standard solutions and indicators suggested by CLARK AND LUBS were employed. The total green weight with the remains of the seed, or cotyledons, cut away was used as an index to growth. In this way the health and growth of the plant is most favorably expressed.—The experiments were conducted under a considerable range of environmental conditions. "Under the most favorable conditions, the three solutions mentioned above, without other modifications, may all yield excellent growth. Plants grown in *Solution B* are invariably a deeper green, presenting a finer appearance and the average of the growth quantities is higher for wheat and corn than in either of the other two solutions. In the unmodified *Solutions A* and *C*, the green weight of peas averages higher than in the unmodified *Solution B*." *Solutions A* and *C* contain a monobasic phosphate and should have a P_H value of about 4.5. Experience shows that *Solution B* varies in active acidity from P_H 5.4 to P_H 7.1; although it is frequently 6.6 to 7.1. "Culture solutions prepared with monobasic phosphates may, however, exhibit a hydrogen-ion concentration which is too high for . . . best growth under certain conditions, and especially is this true in the case of wheat." Solutions made with monobasic potassium or calcium phosphate, unless previously purified, may yield a P_H which is distinctly toxic. Correction to P_H 4.8 to 5.2 by means of NaOH or by use, in part, of a dibasic salt generally yields better growth. Under

conditions resulting in a high transpiration rate more alkaline solutions give better results. "Wheat, corn, and peas are sensitive in the order named to high hydrogen ion concentration."—"Usually the addition to *Solution B* of small amounts of dibasic potassium phosphate, of solid calcium carbonate, and of aluminum hydroxide has given increased yields, often considerably above that of the unmodified solution."—The results indicate in general that there is no "best" solution for the growth of any of the plants used for this work. When the P_H of the solution is considerably less than neutrality there is generally a tendency for this to be shifted toward the neutral point," depending upon the composition of the solution and upon the plant.—*S. M. Zeller.*

403. GREAVES, J. E. The antagonistic action of calcium and iron salts toward other salts as measured by ammonification and nitrification. *Soil Sci.* 10: 77-102. 20 fig. 1920.—See *Bot. Absts.* 7, Entry 451.

404. JOHNSTON, EARL S. Nutrient requirement of the potato plant. *Plant World* 22: 329-336. 4 fig. 1919.—Difficulty was experienced in securing uniform potato plants for the experiments. Cuttings from potato vines, and sprouts removed from tubers at an early stage of development were not satisfactory. Somewhat older sprouts which had well developed roots at time of separation were used. The nutrient solutions employed were made up to one atmosphere osmotic pressure with monobasic potassium phosphate, calcium nitrate, and magnesium sulphate. Roots showed a tendency to rot in the culture solution. The best growth was obtained in a three-salt solution in which the larger amount of the osmotic pressure was due to calcium nitrate.—*Chas. A. Shull.*

405. MOLLIARD, M. Influence d'une dose réduite de potassium sur les caractères physiologiques du *Sterigmatocystis nigra*. [The influence of an insufficient supply of potassium on the physiological characteristics of *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 170: 949-951. 1920.—This is a comparison of cultures of *Sterigmatocystis nigra* containing potassium in an amount which insures optimum development and those which have the amount reduced. Full nutrient solutions contained 0.95 g. of KH_2PO_4 to 1000 cc. of water, the potassium-low solution contained 0.0119 g. It is found that in potassium-starved culture the increase in dry weight is much slower; the sugar consumed in 20 days is equal to that consumed in full nutrient solution in two and two-thirds days. The sugar consumed instead of giving rise to CO_2 gives rise to oxalic acid. There is an absence of conidia and black pigment and the rapid formation of a yellow pigment. A liquid is also produced which is soluble in the solutions and stains blue with iodine.—*C. H. Farr.*

406. PARKER, F. W., AND E. TRUOG. The relation between the calcium and the nitrogen content of plants and the function of calcium. *Soil Sci.* 10: 49-56. 1 fig. 1920.—A tabulation of data on the ash content and nitrogen content of crop plants shows a close correlation between the calcium content and nitrogen content. Potassium, phosphorus, and magnesium show no such relation. The important agricultural plants can be divided into those having a low calcium-nitrogen ratio and low lime requirement, and those having a high calcium-nitrogen ratio and a higher lime requirement. The calcium neutralizes the plant acids formed in protein metabolism.—*W. J. Robbins.*

METABOLISM (GENERAL)

407. ALLEN, E. R. On carbohydrate consumption by *Azotobacter chroococcum*. *Ann. Missouri Bot. Gard.* 7: 75-79. 1 fig. 1920.—With a knowledge of some of the defects of present experimental methods for the study of the physiology of *Azotobacter*, three improvements are suggested for cultures. They are (1) renewal of the energy source in order to increase growth and to produce more marked changes in the amounts of metabolic products; "(2) simultaneous determination of nitrogen and of residual carbohydrates at short intervals" so as to obtain "a more complete picture of the growth processes of *Azotobacter*;" and (3) "operations to facilitate experimental manipulation and possibly obtain even better

results from mechanical agitation." One experiment lacking in the second improvement is reported. "The results show that the rate of carbohydrate consumption in *Azotobacter* cultures does not proceed in a manner similar to the rate of increase in cell numbers predicted by Duclaux. . . . Indeed, the curves resemble the antipode of the Duclaux curve." The fact that the organism utilizes renewals of carbohydrates seems to contradict the idea that there is an accumulation of metabolic products which are toxic to growth. The production of such substances in very short intervals in cultures as slow-growing and as dilute as those used in this experiment seems unlikely.—*S. M. Zeller*.

408. ANONYMOUS. The red coloring matter of plant galls. [Rev. of: M. NIERENSTEIN. Trans. Chem. Soc. 115: 1328-1332. 1919.] Nature 104: 707. 1920.—Investigation of galls on British oak trees caused by *Dryophanta divisa* resulted in isolation of a red pigment to which the name of "dryophantin" was given. This was concluded to be a diglucoside of purpurogallin (the first to be found in nature) and of pathological origin. The author is of the opinion that the other so-called anthocyanes obtained from plant galls are not properly anthocyanes, but are related to "dryophantin," and he proposes to classify these under the name "gallo-rubrones." The reviewer considers the evidence insufficient clearly to establish the absence of anthocyan pigments.—*O. A. Stevens*.

409. ANONYMOUS. Scientific study of the sugar group. [Rev. of: ARMSTRONG, E. FRANKLAND. The simple carbohydrates and the glucosides. 3d ed. x + 239 p. Longmans, Green and Co.: London, 1919.] Nature 104: 526-527. 1920.—The chief import of the review is brought out in the quotation which follows, to the effect that the book "is something more than a new and revised issue; it is to all intents and purposes a new book. . . . Students of the sugar group will have access to a thoroughly satisfactory book."—*O. A. Stevens*.

410. BIBERFELD, JOHANNES. Ergebnisse der experimentellen Toxikologie. Teil II. Organische Substanzen. A. Alkaloide. [Experimental toxicology. Part II. Organic substances. A. Alkaloids.] Ergeb. der Physiol. 17: 1-362. 1919.

411. COSTANTIN, J. Physiologie de l'anthocyane et chimie de la chlorophylle. [Physiology of anthocyan and chemistry of chlorophyll.] Ann. Sci. Nat. Bot. X. 1: xxxviii-llii. 1919.—The author discusses the present status of the knowledge of anthocyan and chlorophyll. He refers to COMBES' work in 1913 in which a treatment of a yellow flavone pigment derived from *Vitis* with nascent hydrogen gave a substance said to have been anthocyan. The author states that the reverse process of oxidation of anthocyan gave yellow flavone. The work of WILLSTÄTTER confirmed COMBES' conclusions. Such work linked up with the problems concerning glucosides and COMBES' experiments with absorption of these in plants is referred to. The author calls attention to the belief of some that anthocyan results from an oxidation. This hypothesis is supported by the discovery that oxydase distribution parallels anthocyan distribution. PALLADIN made anthocyan one of his respiration pigments. WHELDALE's attempt to explain anthocyan production in *Antirrhinum* on a genetic basis is "curieuse" to the author, but he deems it preferable to BATESON's assumption of determinants. NICOLAS in 1919 suggested a study of green and purple plants of the same species in an attempt to re-solve contradictions in oxidation and reducing theories of anthocyan formation. NICOLAS found greater acidity in the red-leaved varieties and the formation of these organic acids locked up some oxygen, reducing therefore the respiratory quotient. The using up of oxygen therefore is not directly a result of anthocyan production. Chlorophyll is thought now to have the formula: $(C_{20}H_{35}OOC) [C_{30}H_{29}N_4Mg] (COOH) (COOCH_3)$. Treatment with alcohol will produce a substitution of C_2H_5 for phytol group $C_{20}H_{39}$ and give WILLSTÄTTER's crystallizable chlorophyll.—*James P. Kelly*.

412. DANGEARD, P. A. La structure de la cellule vegetale et son metabolisme. [The structure of the plant cell and its metabolism.] Compt. Rend. Acad. Sci. Paris 170: 709-714. 1920.

413. FREE, E. E. Sugar metabolism in cacti. [Rev. of: SPOEHR, H. A. The carbohydrate economy of cacti. Carnegie Inst. Washington, Publ. 287. 1919.] *Plant World* 22: 308-309. 1919.

414. GATIN, C. L., AND M. MOLLIARD. Utilisation comparée de divers constituants de la membrane par le *Xylaria Hypoxylon* L. [The comparative utilization of various constituents of the cell wall by *Xylaria Hypoxylon* L.] *Rev. Gén. Bot.* 32: 216-225. 1920.—A study of the digestive action of a wood-destroying fungus (*Xylaria Hypoxylon*) on isolated constituents of the cell wall in aseptic cultures. The constituents under investigation were added to a mineral nutrient solution made up as follows: tap water, 100 cc.; potassium nitrate, 0.2 g.; ammonium phosphate, 0.05 g.; magnesium sulphate, 0.05 g. Glucose and starch were also used for comparison. Of all the substances tried, pectin was the most readily utilized by *Xylaria*; 1.633 g. were used in building up 0.693 g. dry weight of mycelium. Then followed in order xylose and glucose, mannogalactan of the carob, arabinose (about half as well used as pectin), starch, and xylane. Good growth was also obtained on corrozo and the mucilage of flax, whereas cherry gum was only slightly used, and gelose not at all. A further experiment showed lignin to be very readily utilized.—*L. W. Sharp.*

415. HAMMARSTEN, HAROLD. Quantitative Versuche über Cannizzaro's Reaktion bei der Kondensation der Acetaldehyde mit wässrigen Alkalien. [Quantitative experiments on Cannizzaro's reaction in the condensation of acetaldehyde by aqueous alkaline solution.] *Ann. Chem. [Liebig]* 420: 262-275. 1920.—Acetaldehyde was subjected to $N/2$ KOH, $N/3$ Ba(OH)₂, or buffer salt mixtures for periods ranging from 1 to 240 hours and at temperatures of 0°, 18°, and 50°C. At P_H 6.8 and 50° the aldehyde underwent CANNIZZARO's reaction (simultaneous oxidation and reduction) to the extent of 2 per cent in 3 hours, with no formation of wax. The reaction extended to 3.8 per cent in 3 hours, with no wax formation, at P_H 9.6. At P_H 10.7 the CANNIZZARO reaction extended to 5.8 per cent of the aldehyde in 18.5 hours, with a yield of 10 to 20 per cent of wax. The CANNIZZARO reaction is quite insignificant, relative to the velocity of the aldol condensation; for the latter proceeds so rapidly that only very little acid or alcohol can be formed. The limited extent of the CANNIZZARO reaction at 50° is ascribed to condensation of acetaldehyde to acetaldol, the latter decomposing to crotonic aldehyde.—*W. E. Tottingham.*

416. LEGROUX, RENÉ, AND JOSEPH MESNARD. Vitamines pour la culture des bactéries. [Vitamines in the culture of bacteria.] *Compt. Rend. Acad. Sci. Paris* 170: 901-904. 1920.—It is found that certain globules are necessary for the growth and development of the bacilli of Pfeiffer (influenza).—*C. H. and W. K. Farr.*

417. MÜLLER, ERICH. Die Dehydroxydation der Aldehyde. Mechanismus ihrer Oxydation. [The dehydroxydation of aldehydes. Mechanism of their oxidation.] *Ann. Chem. [Liebig]* 420: 241-263. 1920.—Dehydroxydation is electrochemical or chemical oxidation of formaldehyde, acetaldehyde, and benzaldehyde in alkaline solution, with the production of gaseous hydrogen and an acid. Formaldehyde yields hydrogen by the action of certain metals which also accelerate the CANNIZZARO reaction (simultaneous oxidation and reduction). The results of experiments with CuO, Cu₂O and Ag₂O as catalysts are given. The mechanism of dehydroxydation in the case of acetaldehyde is supposed to proceed in two alternate ways, with the oxyaldehyde as a primary product, as follows: (1) Acetaldehyde-water + electrical charge = oxyacetaldehyde + hydrogen ion. And (2) Oxyacetaldehyde + electrical charge = acetic acid + hydrogen ion. (The H-ion apparently functions in the reduction of aldehyde to alcohol.) Or (3) Oxyacetaldehyde + electrical charge + acetic acid + molecular hydrogen.—If reaction (3) is more rapid than (2) dehydroxydation occurs, and hydrogen appears.—*W. E. Tottingham.*

418. STRAND, E. [Rev. of: LIPSCHÜTZ, A. Pflanze und Tier. [Plant and animal.] 42 p., 8 fig. Theodor Thomas: Leipzig.] *Arch. Naturgesch., Abt. A*, 83, Heft 4: 209. 1919.—The author discusses the origin of the living substance of the plant and the formation of the living substance of the human body out of food.—*C. E. Allen.*

419. TOCHINAI, YOSHIHIKO. Studies on the food relations of *Fusarium lini*. Ann. Phytopath. Soc. Japan 13: 22-33. 1920.—The following substances were tested as sources of carbon: nine carbohydrates—viz., glucose, levulose, galactose, sucrose, maltose, lactose soluble starch, inulin, and arabin—in 2 per cent solutions; six organic acids—viz., malic, succinic, maleic, fumaric, racemic, and citric—in 1 and 0.1 per cent solutions; and glycerine, mannite, vanillin, thymol, and α -naphthol in 2 per cent solutions. The chemicals were added in the above indicated quantities to a standard nutritive solution prepared as follows, NH_4NO_3 , 1 g.; KH_2PO_4 , 0.50 g.; Mg SO_4 , 0.25 g.; and redistilled water 1000 g. As sources of nitrogen, ammonium sulfate, sodium nitrate, potassium nitrate, peptone, and urea in 2 per cent solutions, and acetamide, succinamide, dicyandiamide, and asparagine in 1 per cent solutions were tested. Each chemical was added to a standard nutritive solution of the following composition: KH_2PO_4 , 0.50 g.; MgSO_4 , (crystal) 0.25 g.; cane sugar, 20 g.; and redistilled water 1000 cc. Results were checked at the end of two weeks growth. The carbohydrates tested gave the following dry weights in grams of mycelia: inulin 0.299; glucose 0.274; arabin 0.147; maltose 0.151; soluble starch 0.125; levulose 0.084; galactose 0.072; sucrose 0.044; and lactose 0.039. Organic acids as sources of carbon were unfavorable to the fungus, which could develop only in low percentages, such as 0.1 per cent. As indicated by the growth made, the organic acids may be arranged as follows in descending order: succinic, malic, citric, fumaric, maleic, and racemic. In the nutritive solution containing racemic acid the d-tartaric was more readily assimilated than the l-tartaric acid, as determined by the change in optical activity. Mannite was a favorable source of carbon, 0.24 g. (dry weight) of mycelium being produced, while glycerine gave but 0.024 g. The phenol derivatives prevented growth. Organic nitrogen compounds are far better sources of nitrogen than inorganic compounds, the dry weights of mycelium in grams being as follows: peptone 0.448; urea 0.251; sodium nitrate 0.198; ammonium phosphate 0.194; ammonium sulphate 0.038; and potassium nitrate 0.012. The amides are generally good sources of nitrogen for this fungus, the following dry weights in grams of mycelia being obtained: asparagine 0.288; acetamide 0.173; dicyandiamide 0.516; and succinamide 0.143.—*L. M. Massey*.

METABOLISM (ENZYMES, FERMENTATION)

420. ANDERSON, J. A., E. B. FRED, AND W. H. PETERSON. The relation between the number of bacteria and acid production in the fermentation of xylose. Jour. Infect. Diseases 27: 281-292. 1920.—The rate of growth of *Lactobacillus pentosaceticus* was compared with its rate of acid production in the fermentation of xylose. Both the plate and the direct counting method of BREED were used for the counting of the bacteria. The volatile (acetic) and the nonvolatile (lactic) acids were determined. It was found that the acid production is most rapid during the period of maximum growth of the organisms, and a decline in the rate of growth is accompanied by a decrease in acid production. The bacterial numbers reach a maximum within 48 hours after inoculation, while the maximum acidity is found only after several days. In the presence of calcium carbonate, the bacteria multiply more rapidly and reach a higher number, accompanied by a more nearly complete fermentation.—*Selman A. Waksman*.

421. SHERMAN, H. C., I. D. GARARD, AND V. K. LA MER. A further study of the process of purifying pancreatic amylase. Jour. Amer. Chem. Soc. 42: 1900-1907. 1920.

ORGANISM AS A WHOLE

422. ANONYMOUS. The tenacity of prickly pear seedlings. Agric. Gaz. New South Wales 31: 571. 1920.—Prickly pear, *Opuntia* sps. seedlings without water remained alive for 12 months in an office.—*L. R. Waldron*.

423. CHEMIN, E. Observations anatomiques et biologiques sur le genre "Lathraea." [Anatomical and biological observations on the genus "Lathraea."] Ann. Sci. Nat. Bot. X. 2: 125-272. 1 pl., 88 fig. 1920.—See Bot. Absts. 7, Entry 319.

424. LOTKA, ALFRED J. **Analytical note on certain rhythmical relations in organic systems.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 410-415. 1920.—A discussion of mathematical laws of some types of periodic phenomena. Certain applications of the laws of chemical dynamics indicate the occurrence of damped (transitory) oscillations, and only such were expected "in the absence of geometrical, structural causes." The author finds, however, that in certain cases his method indicates undamped oscillations. Consider a system in evolution, where species of matter (organic or inorganic) having the masses $X_1, X_2 \dots X_n$ are characterized by certain parameters Q and physically conditioned by other parameters P . "For a very broad class of cases, . . . the course of events in such a system will be represented by a system of differential equations of the form

$$\left. \begin{aligned} \frac{dX_i}{dt} &= F_i(X_1, X_2 \dots X_n; P, Q) \\ (i &= 1, 2 \dots n) \end{aligned} \right\}$$

The author here considers especially a simple case, that of the quantitative relations between a plant species and an animal species feeding upon it. Undamped oscillations in the abundance of the species are shown to result.—Howard B. Frost.

425. MOREAU, F. (M. AND MME.) **Recherches sur les lichens de la famille des Peltigéracées.** [Researches on lichens of the family Peltigeraceae.] Ann. Sci. Nat. Bot. X. 1: 29-138. 13 pl., 23 fig. 1919.—See Bot. Absts. 7, Entry 371.

426. PIETSCH, ALBERT. **Wie erklärt sich das lange Hängenbleiben der Blätter an einigen phanerogamen Holzgewächsen im Herbst 1919?** [What is the explanation for the late retention of the foliage of several phanerogamous woody plants in the fall of 1919?] Naturwiss. Zeitschr. Forst-u. Landw. 18: 150-155. 1920.—See Bot. Absts. 7, Entry 140.

GROWTH, DEVELOPMENT, REPRODUCTION

427. BERNBECK. **Das Wachstum im Winde.** [Growth and wind.] Forstwiss. Centralbl. 42: 27-40, 59-69, 93-100. 1920.—See Bot. Absts. 7, Entry 113.

428. BURNS, GEORGE P. **Eccentric growth and the formation of redwood in the main stem of conifers.** Vermont Agric. Exp. Sta. Bull. 219. 10 pp., 4 pl., 10 fig. 1920.—See Bot. Absts. 7, Entry 318.

429. HARVEY, E. N. **An experiment on regulation in plants.** Amer. Nat. 54: 362-367. 1 fig. 1920.—An analysis of factors retarding lateral outgrowths of plants. The author recalls the already known facts that growing stem tip or apical bud has inhibitory influences on lower latent buds and that active root inhibits growth of others above it. He reports an experiment to support the idea that regulatory influence of one part over another in plants is not due to transport of materials. The author thinks that it is dependent on living protoplasts in the organism whose selective permeability leads to an electrical polarity that determines the biological polarity of the organism.—J. P. Kelly.

430. REED, H. S. **The dynamics of a fluctuating growth rate.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 397-410. 3 fig. 1920.—This is a study of the growth rate of a selected lot of shoots on young apricot trees, with reference not only to the type of growth, but also to the intraseasonal periodicity of growth. The growth rate exhibited its greatest velocity in the early part of the growing season and declined as the season advanced, exhibiting three intraseasonal cycles of growth. The growth during each cycle is expressed by the formula of autocatalysis,

$$\log \frac{x}{a - x} = K(t - t_1)$$

The growth rate for the entire season conforms to that of a chemical reaction consisting of two unimolecular reactions, one of which alternately accelerates and retards the other,

$$x = 210 [1 - e^{-.095(t-1)}] + 19.1 \left[e^{-.055t} \cos \frac{\pi}{14} t \right]$$

If growth be assumed to be proportional to the amount of active catalyst present, a method is available for studying the dynamics of the growth process.—*H. S. Reed.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

431. JACCARD, P. Inversion de l'excentricité des branches produite expérimentalement. [The experimental inversion of the eccentricity of branches.] *Rev. Gén. Bot.* 32: 273-281. 2 pl., 1 fig. 1920.—Many authors have considered the eccentric growth of the lateral branches of trees to be the result of the polarizing action of a geotropic excitation having its seat in the terminal portion, and have therefore called the wood of the larger side "geotropic wood." If growing branches are tied in the form of a circle with the upper face on the inside, thus reversing the usual tension-compression relation of the upper and lower faces, a reversal of the eccentricity occurs. The eccentricity is therefore due to the mechanical action of weight (tension and compression) on the growing tissues, and not to a geotropic excitation. This conclusion is supported by the behavior of plants kept for some months on a large clinostat. Here also the eccentricity is reversed; because of a slight centrifugal force (1/20 gravity) developed by the clinostat, the upper face of the branch is more strongly compressed during one half of the rotation than is the lower face during the other half. The same stimulus, such as longitudinal compression, accelerates wood formation in some species and retards it in others. Conifers and dicotyledons differ in this respect. The increase in the thickness of the wood on one side compensates for a decrease on the other; eccentricity involves no absolute increase in the mass of woody tissue in a given length of the branch.—*L. W. Sharp.*

GERMINATION, RENEWAL OF ACTIVITY

432. ANONYMOUS. Notes and comments. *Australian Nat.* 4: 160. 1920.—A seed germinating in one year instead of the usual two.—*T. C. Frye.*

433. LESAGE, P. Contributions a l'étude de la germination des spores de mousses. [Germination of moss spores.] *Compt. Rend. Acad. Sci. Paris* 166: 744-747. 1918.—The author shows that the spores of certain mosses are capable of germination after being dried for periods of from 3 to 7 years. In the case of *Funaria hygrometrica*, which proved an especially good species for experimental purposes, he found that the optimum temperature for germination was between 21 and 22°C.; that darkness retarded the germination; and that spores sown in distilled water germinated better if the vessels of distillation were glass rather than copper.—*A. W. Evans.*

TEMPERATURE RELATIONS

434. COVILLE, FREDERICK V. The influence of cold in stimulating the growth of plants. *Proc. Nation. Acad. Sci. [U. S. A.]* 6: 434-435. 1920.—The attainment of winter dormancy by trees and shrubs is not dependent upon exposure to cold. Experiments with controlled temperatures further indicate that a period of chilling is necessary for normal resumption of growth in the spring; in plants kept warm throughout the winter, the spring growth is delayed and abnormal. Exposure to cold results in transformation of stored starch to sugar, with the consequent development of high osmotic pressures.—*Howard B. Frost.*

435. MATISSE, G. Action de la chaleur et du froid sur l'activité des êtres vivants. [Action of heat and cold upon the activity of living organisms.] ii + 556 p., 175 fig. Emile Larose: Paris, 1919.—According to the author he has attempted in this work to correlate the viewpoint

of the physical sciences with that of physiology. He assumes that the organism is not the sum of the functions of its organs, and that it is important to study the reactions of the organism complete. His experiments are intended to be in this direction. While drawing something from botanical material in the historical discussion, the experiments are based largely on animal forms.—*B. M. Duggar.*

RADIANT ENERGY RELATIONS

436. ASTON, B. C. **Radio-active fertilizers and plant growth.** *New Zealand Jour. Agric.* 20: 172-173. 1920. See *Bot. Absts.* 7, Entry 457.

437. BLACKMAN, V. H. **Radioactivity and normal physiological function.** *Ann. Botany* 34: 299-302. 1920.—The writer presents a brief résumé of H. Zwaardemaker's researches dealing with the radio-activity of certain substances in relation to physiological function. Though the results here obtained are primarily of fundamental importance to animal physiology, their probable application to plant physiology is indicated.—*R. W. Webb.*

TOXIC AGENTS

438. BERTRAND, GABRIEL. **Action de la chloropicrine sur les plantes supérieures.** [The effect of chloropicrine on the higher plants.] *Compt. Rend. Acad. Sci. Paris* 170: 858-860. 1920.—Concentrations of chloropicrine of 200 g. or less per cubic meter were tried on trees and shrubs. This concentration was reduced progressively in an attempt to find the minimal effect. Twelve to twenty grams gave the same effect as is found in autumnal coloration and abscission. Two to three grams gave an effect similar to frost or anesthetics. A still smaller amount caused the leaves to fall off without change of color or alteration in turgescence. It was found that young leaves were less sensitive than herbaceous. It is suggested that chloropicrine might be found valuable in ridding plants of their leaf parasites.—*C. H. and W. K. Farr.*

439. BERTRAND, GABRIEL. **Des conditions qui peuvent modifier l'activité de la chloropicrine vis-à-vis des plantes supérieures.** [The conditions which frequently modify the effect of chloropicrine upon the higher plants.] *Compt. Rend. Acad. Sci. Paris* 170: 952-954. 1920.—In this study leafy shoots of eight species of trees were used. Concentrations were tried between from 1 to 200 g. per cubic meter for periods of from 10 to 60 minutes. The effect is about the same, providing the product of time and concentration is the same. Humidity does not seem to alter the effect, nor is temperature a very important factor.—*C. H. Farr.*

440. MEDES, GRACE AND J. F. MCCLENDON. **The effect of anesthetics on living cells.** *Proc. Nation. Acad. Sci. [U. S. A.]* 6: 243-246. 1920.—Certain anesthetics were applied to animal cells (*Cassiopea*) in sea water and to plant cells (*Elodea*) in a solution of NaHCO_3 in distilled water. The effects differed with the organism and the anesthetic employed, and with the particular cell activity or property considered. In the case of *Elodea*, four anesthetics—alcohol, ether, chloroform, and chloretone—all increased respiration and permeability, but decreased photosynthesis; while they sometimes increased and sometimes decreased protoplasmic rotation.—*Howard B. Frost.*

PHYSIOLOGY OF DISEASE

441. JODIDI, S. L. **A mosaic disease of cabbage as revealed by its nitrogen constituents.** *Jour. Amer. Chem. Soc.* 42: 1883-1893. 1920.—This disease is characterized by denitrification taking place in the affected tissues. The nitrates are, in part, reduced to ammonia, which is lost; and, in part, to nitrites. The latter reacts on the ammonia group of various organic compounds and brings about the elimination of elementary nitrogen.—*J. M. Brannon.*

442. JODIDI, S. L., S. C. MOULTON, AND K. S. MARKLEY. The mosaic disease of spinach as characterized by its nitrogen constituents. *Jour. Amer. Chem. Soc.* 42: 1061-1070. 1920.—The author finds that the lower nitrogen content of the diseased tissues may safely be considered as one of the striking characteristics of the mosaic disease of spinach. The leaves of the normal plants have higher nitric-nitrogen content than the blighted spinach. The difference in nitrate content of healthy and blighted root is slight. The higher ammonia content and presence of nitrites may be said, also, to be characteristic of spinach blight. The diseased plants were found capable of building up proteins. The leaves of the diseased plants have a smaller proportion of acid amide, basic, and non-basic nitrogen, but a larger proportion of peptide and protein nitrogen than the corresponding normal tissues. It is because of these findings—together with the difference in total nitrate, nitrite, and ammoniacal nitrogen content already reported—that we logically and forcibly come to the conclusion that the pathological condition is brought about by the process of denitrification which takes place in the spinach tissues.—*J. M. Brannon.*

MISCELLANEOUS

443. GALIPPE, V. Recherches sur la résistance des microzymas à l'action du temps et sur leur survivance dans l'ambre. [The longevity of microzymas and its survival in amber.] *Compt. Rend. Acad. Sci. Paris* 170: 856-858. 1920.—See Bot. Absts. 7, Entry 391.

444. HAMBLIN, C. O. To infect lucerne seed with nodule organisms. *Agric. Gaz. New South Wales* 31: 466. 1920.—See Bot. Absts. 7, Entry 30.

445. T., E. N. Botany at the British Association. *Nature* 104: 520-521. 1920.

446. THOMPSON, LEONARD R. Advantages of solid paraffin for sealing anaerobic fluid cultures. *Jour. Infect. Diseases* 27: 240-244. 1920.—A method is described for sealing tubes with solid paraffin. A greater percentage of positive growths with stock anaerobic cultures has been obtained than with parallel tubes sealed with liquid paraffin.—*Selman A. Waksman.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

ACID SOILS

447. HARTWELL, BURT L., AND F. R. PEMBER. The effect of dicalcium silicate on an acid soil. *Soil Sci.* 10: 57-60. 1920.—Pot experiments on an acid soil show that the beneficial effect of "dicalcium silicate" on the growth of lettuce is due to its neutralizing effect. "Dicalcium silicate" and "hydrated silica" do not appear to be of benefit because of their silicon content.—*W. J. Robbins.*

448. MARTIN, W. H. The relation of sulfur to soil acidity and to the control of potato scab. *Soil Sci.* 9: 393-409. 1920.

449. MIRASOL, JOSE JISON. Aluminum as a factor in soil acidity. *Soil Sci.* 10: 153-217. 12 pl. 1920.—Experiments were performed to determine the effect of aluminum salts alone or in combination with calcium carbonate or with acid phosphate on the growth of sweet clover in sand; the effect of limestone and acid phosphate on the acidity and productivity of soil; the effect of the removal of some aluminum from the soil on the growth of sweet clover and whether iron and manganese are factors in the acidity of the soils investigated. Aluminum salts were highly toxic to sweet clover when applied in amounts chemically equivalent to the acidity of the soil and fatal in amounts five times the acidity of the soil. Calcium carbonate or acid phosphate decreased or eliminated the toxicity of aluminum salts. Aluminum hydroxide was not toxic. Both limestone and acid phosphate reduced the acidity of

450. SHEDD, O. M. A proposed method for the estimation of total calcium in soils and the significance of this element to soil fertility. Soil Sci. 10: 1-14. 1920.—A rapid and accurate method for the determination of total calcium in soils is described. The total calcium content of some Kentucky soils is so low that their deficiency in this substance is important, as well as is the deficiency in phosphorus and nitrogen. Cultivation causes a loss in calcium. The best soil types contain the most calcium; the poorest, the least. A ton of limestone or rock phosphate per acre may add more calcium than is already present.—*W. J. Robbins.*

456. SINGH, THAKUR MAHADEO. The effect of gypsum on bacterial activities in soils. *Soil Sci.* 9: 437-468. 1920.—Determinations were made of the effect of calcium sulphate, calcium carbonate, or combinations of the two on the ammonification of dried blood, nitrification, and the growth of *Agrobacterium* and *Micrococcus* in soil.

fication of ammonium sulfate, fixation of nitrogen, fixation of nitrogen by *B. radicola*, and yield of plants. Ammonification was decreased by gypsum and by mixtures of lime and gypsum. Nitrification was decreased by calcium sulphate but increased by calcium carbonate and gypsum together. Nitrogen fixation was stimulated by 100 pounds per acre of gypsum, but larger amounts had less stimulative effect. The yield and potassium content of red clover was increased by 1000 pounds of gypsum per acre, but other leguminous crops or wheat were not affected. Gypsum increased the soil acidity and, in some cases, the amount of soluble potassium.—*W. J. Robbins*.

FERTILITY STUDIES

457. ASTON, B. C. **Radio-active fertilizers and plant growth.** New Zealand Jour. Agric. 20: 172-173. 1920.—A brief review of work in England and America.—*N. J. Giddings*.

458. HARRIS, F. S. **Effect of soil alkali on plant growth.** (Abstract.) Utah Acad. Sci. 1: 131-132. 1918.

459. LEININGEN-WESTERBURG (GRAF ZU.) **Rauchschäden und einschlagige bodenkundliche Fragen.** [Smoke injury and related matters of soil science.] Forstwiss. Centralbl. 42: 18-93. 1920.—There is a close relation between soil composition and quality, and the damage which may result to vegetation from various fumes and dusts. Smoke damage to plants is usually indirect, as the effect of the fumes is on the soil and humus. Lime is especially necessary in soils exposed to acid fumes, and should be added in the cheapest way possible where soils are poor in lime; otherwise the acids will remove all the lime present. This applies both to open and to forest lands. It has been computed that in the vicinity of Stolberg (Rhine province) approximately 800 grams of sulphuric and hydrochloric acids are deposited annually per square meter of soil. Lime also combines with poisonous zinc, copper, iron, and mercury salts and renders them harmless to plants, but has little or no effect on arsenic compounds. Some of these compounds in small quantities stimulate plant growth, but in large quantities hinder or destroy it. Dust from lime, cement, or magnesite ovens, etc., may act as a fertilizer, or if in too great volume and not occasionally harrowed into the soil may form a crust which will injure vegetation. Soot does not in itself injure plants, but does so indirectly by sticking on the foliage and adsorbing poisonous gases from the air. In case of many substances, such as calcium, magnesium, chlorine, fluorine and sulphur compounds, which are already present in soil not exposed to smoke, it is difficult to determine the amount of injury due to fumes, since chemical analysis of the plants will not show the origin of the poisons they may contain.—*W. N. Sparhawk*.

460. MCCOOL, M. M., AND C. E. MILLAR. **The formation of soluble substances in soils taken from widely separated regions.** Soil Sci. 10: 219-235. 1 fig. 1920.—Samples of air-dry soils were leached with distilled water until the freezing-point depression of the soil was zero. The soil was then incubated at 25°C., and the freezing-point lowerings were determined after 5, 10, 30, and 60 days. Sub-soils and new soils formed soluble salts very slowly. New soils are less active than somewhat older soils, and aged soils are almost inert. Soils from acid regions were not more soluble than those which had weathered more. The formation of soluble material increased with grinding and with treatment with sodium nitrate.—*W. J. Robbins*.

461. NIKLAS, H. **Übersicht über Bayerns Bodenverhältnisse.** [Summary of Bavarian soil conditions.] Forstwiss. Centralbl. 42: 123-135. 1920.—The author discusses the construction of a general soil map for Bavaria, based on the prevailing crops grown. Complete soil surveys are lacking. Soils may be classified according to climatic conditions, geological origin, or to texture. For practical purposes the latter classification is the best, both for agriculture and for forestry. The 434 districts of Bavaria are classified in 7 soil groups as follows: (1) very heavy; (2) heavy; (3) medium; (4) heavy and light; (5) light and medium; (6) light, and (7) meadow soils due to climatic conditions regardless of texture.—(1) This group comprises 13 per cent of the total area of Bavaria, and grows principally wheat and

grass; (2) 12 per cent, and grows wheat and barley; (3) 14 per cent, growing barley, (4) and (5) 17 per cent; (6) 31 per cent, and (7) 13 per cent. The lighter soils grow principally rye and oats. The value of such a map is discussed.—*W. N. Sparhawk.*

462. PARKER, F. W., AND E. TRUOG. The relation between the calcium and the nitrogen content of plants and the function of calcium. *Soil Sci.* 10: 49-56. *Fig. 1.* 1920.—See *Bot. Absts.* 7, Entry 406.

463. ROBERTS, GEORGE, AND A. E. EWAN. I. Report on soil experiment fields. II. Maintenance of fertility. *Kentucky Agric. Exp. Sta. Bull.* 228: 89-131. 1920.—Results are reported from eight experiments fields on as many different soil areas of the state, ranging over periods of four to nine years. The requirements for phosphorus, potassium, nitrogen, and limestone were determined, and a comparison was made of acid phosphate and rock phosphate on limed and unlimed soil. The rotation employed in most cases is corn, soy beans, wheat, and clover. None of the treatments give any material increase in crops on the Lexington field, representing the highly phosphatic soils of the Central Blue Grass region. On all the soils represented by the other fields, limestone and phosphates give very large increases. The returns from potassium salts in connection with phosphates or in connection with phosphates and limestone give little or no increase in yields. Nitrate of soda gives practically no increase for corn, but gives small or medium increases for wheat and tobacco. In the comparison of acid phosphate and rock phosphate at the average annual rate of 200 pounds per acre of 16 per cent acid phosphate and 400 pounds per acre of 32 per cent rock phosphate, the rock phosphate has generally given the larger increases on unlimed ground, while the acid phosphate has generally given the larger increases on limed ground.—*George Roberts.*

464. ROBINSON, C. S. The determination of carbon dioxide in water-soluble carbonates. *Soil Sci.* 10: 41-47. *Fig. 1.* 1920.—A description is given of precautions used and modifications in the apparatus made in determining the carbon dioxide content of limestones, marls, and soils by Van Slyke's titrimetric and gasometric methods.—*W. J. Robbins.*

465. SCHOLLENBERGER, C. H. Organic phosphorus content of Ohio soils. *Soil Sci.* 10: 127-141. *Fig. 1.* 1920.—The relation of the organic phosphorus content of twelve soils in relation to other soil constituents is reported. Virgin soil samples are richer in total phosphorus than cultivated soils of the same type, and the organic phosphorus contents stand in the same order as the contents of total phosphorus. From average data one-third of the phosphorus in the surface and one-fifth in the subsurface is organic. Organic phosphorus is probably not of a high order of availability.—*W. J. Robbins.*

466. THORNBUR, H. Cover crops, tillage and commercial fertilizers. *Better Fruit* 15: 5, 20-22. Aug., 1920.

467. THORNE, CHARLES E. Carriers of nitrogen in fertilizers. *Soil Sci.* 9: 487-494. 1920.—Field experiments since 1894-5 with cereals and clover or potatoes and clover rotations fertilized with sodium nitrate, linseed meal, dried blood, ammonium sulfate, and tankage show in 40 comparisons with but 2 exceptions that sodium nitrate has produced the largest yield. The same is true of a tobacco-wheat-clover rotation except on limed land, where the yields from the ammonium sulphate slightly exceed those from sodium nitrate.—*W. J. Robbins.*

MOISTURE RELATIONS

468. CUNNINGHAM, BRYSSON. Rainfall and drainage. [Rev. of: CRASTER, J. E. E. Estimating river flow from rainfall records (*Engineering*. Jan. 2, 1920). *Nature* 105: 42. 1920.]—Craster finds the proportion of run-off to rainfall varies in both England and America from 33 to 67 per cent. That not less than 1 mm. (0.04 inch) of rainfall is required to wet vegetation and surface of ploughed land; this being lost by evaporation after every rain. Percolation may be estimated roughly at not less than 10 per cent. Mentions also data on transpiration.—*O. A. Stevens.*

469. GARDNER, WILLARD. A capillary transmission constant and methods of determining it experimentally. *Soil Sci.* 10: 103-126. *Fig. 1-8 B.* 1920.—A capillary-transmission-constant similar to the specific conductivity of metals and the specific thermal conductivity of heat conductors is defined, and methods for its measurement are described. Using this constant, a calculation is made which shows that in a certain soil 12 inches of water may be available from a 12 foot water-table in 30 days.—*W. J. Robbins.*

470. KARRAKER, P. E. The effect of the initial moisture in a soil on moisture movement. *Soil Sci.* 10: 143-152. 1920.—Soils were placed in vertical tubes with their lower ends in water, and the penetration of water was determined. The rate of water movement was about as great in air or oven dry soils as in soils containing up to about 6 per cent initial moisture. In saturated sand the movement was 1.56 times that in air-dry sand.—*W. J. Robbins.*

471. LIVINGSTON, BURTON E., AND RIICHIRO KOKETSU. The water-supplying power of the soil as related to the wilting of plants. *Soil Sci.* 9: 469-485. 1920.—See *Bot. Absts.* 7, Entry 399.

472. WOLKOFF, M. I. Effect of various soluble salts and lime on evaporation. Capillary rise and distribution of water in some agricultural soils. *Soil Sci.* 9: 409-436. *4 fig.* 1920.—Soluble salts added to soil materially decreased the evaporation of soil moisture. The efficiency of a salt in decreasing evaporation was shown to depend upon the osmotic concentration of salts in the surface inch of soil. The soils from which the least water evaporated showed the greatest osmotic concentration in the first inch. There was practically no diffusion of the salts downward against the rise of capillary water. In two agricultural soils used, sodium chloride decreased the capillary rise of water. Calcium oxide in drab clay and potassium phosphate in brown silt loam accelerated water rise. In these soils the addition of the salts increased the water content in the first 8 inches, as compared with untreated soil. The crust formed on the surface of the soil by some of the salts did not retard evaporation. With untreated soils, the texture of the soil influences the extent of evaporation. Soils having a greater amount of fine material show greater loss of water by evaporation.—*Dorothy Wilson.*

PEAT

473. ALWAY, F. J. Chemical requirements of peat soils in the light of European experience. *Jour. Amer. Peat Soc.* 13: 327-341. 1920.—European peat soils are placed in two classes, those with (1) low lime requirement, and (2) high lime requirement.—*G. B. Rigg.*

474. LEVIN, E. The use of peat as a fertilizer in Michigan. *Jour. Amer. Peat Soc.* 13: 319-327. 1920.—Fertilizer prepared by composting peat and manure gave good results on uplands.—*G. B. Rigg.*

475. PUCHNER, H. Hysteresis of aqueous solutions of peat soil. *Jour. Amer. Peat Soc.* 13: 351. 1920.—An aqueous extraction of peat soil contained gels of silicic acid, ferric hydroxide, and alumina. On ignition the extract yielded alumina, ferric oxide, manganese oxides, lime, magnesia, sulphate, phosphate, and silicate.—*G. B. Rigg.*

476. ROST, C. O. Pyrites and its toxic oxidation products in peat soils. *Jour. Amer. Peat Soc.* 13: 303-306. 1920.—Iron sulphide is widely distributed in peat soils. It appears mostly as pyrite, which is insoluble in water. In air it is oxidized to ferrous sulphate and sulphuric acid, both of which are soluble and toxic to plants.—*G. B. Rigg.*

MISCELLANEOUS

477. LINHART, G. A. A new and simplified method for the statistical interpretation of biometrical data. *Univ. California Publ. Agric. Sci.* 4: 159-181. *12 fig.* 1920.—See *Bot. Absts.* 7, Entry 396.

478. NIKLAS, H. *Die Bedeutung der Geologie für die land- und Forstwirtschaftliche Bodenkunde.* [The significance of the science of geology with relation to agricultural and forest soil science.] *Naturwiss. Zeitschr. Forst-u. Landw.* 18: 22-35. 1920.—After considering all cultural conditions of the soil in 434 agricultural precincts, NIKLAS divides the soils in seven classes, based on heavy, intermediate, and light soils, and variety of products produced. The prepared chart showed a marked coincidence with the geological charts, although these were not considered in preparing the soil chart. In so far as forestry is concerned, a soil study is still more imperative, because of the longer period of time in which mistakes must be realized. It will be necessary to make a study of the chemical and physical properties of the various soils of each geological formation, and to relate this study to one of the principal tree species. The employment of agriculturists and foresters in the various geological bureaus, whose duties would be to prepare the geological charts for practical use, is recommended.—*J. Roeser.*

479. NIKLAS, H. *Eine landwirtschaftliche Bodenübersichtskarte von Bayern.* [An agricultural soil survey chart for Bavaria.] *Naturwiss. Zeitschr. Forst-u. Landw.* 18: 62-65. 1920.—As a temporary guide for constructing a soil chart for Bavaria, for forestry and agriculture, the author has made use of the official cultivation statistics, which have been kept for the past 20 years. He contends that the knowledge of the soil gained through long years by agriculturists and foresters shows itself in the choice of cultural species growing on the ground. The author essentially repeats his observations of an earlier article. (See Bot. Absts. 7, Entry 478), appearing in the previous issue of this paper.—*J. Roeser.*

480. SCHUSTER, MATTHÄUS. *Wie soll der Land- und Forstwirt Geologische Karten lesen?* [How shall the agriculturist and forester read geological charts?] *Naturwiss. Zeitschr. Forst-u. Landw.* 18: 10-22. 1 fig. 1920.—The principal reason why agriculturists and foresters have not reconciled themselves to geological charts is that they cannot familiarize themselves with the manner of representation used. The modern charts often contain a mass of colors and symbols, which are apt to confuse the user. The Bavarian charts have been prepared to meet both the scientific and practical demand, and are easily legible without detailed explanations. The author gives a detailed description of the method of preparation and the methods of interpreting these charts; and by means of a short field trip over the terrain represented on a model chart, shows the relation existing between rock and soil and the cultural use of the soil, and also explains the methods employed by the geologist to show the relations.—*J. Roeser.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

GENERAL

481. ANONYMOUS. [Rev. of: BLATTER, ETHELBERT. *Flora Arabica. Part 1.* *Rec. Bot. Surv. India* 3, No. 1.] *Nature* 104: 609. 1920.—Includes list of thirty-eight families (BENTHAM and HOOKER arrangement) including vernacular names and uses, also discussion of botanical regions.—*O. A. Stevens.*

482. ANONYMOUS. [Rev. of: GAMBLE, J. S. *Flora of the Presidency of Madras. Part 3. P. 391-577. Leguminosae—Caesalpiniodeae to Caprifoliaceae.* Aldard and Son, and West Newman, Ltd.: London, 1919.] *Nature* 105: 36. 1920.

483. BENOIST, R. *Plantes récoltées par M. E. Wagner en République Argentine.* [Plants collected by M. E. Wagner in the Argentine.] *Bull. Mus. Hist. Nat. [Paris]* 25: 655-661. 1919.—Detailed notes concerning some 20 species collected in the province of Santiago include information as to habitat, economic importance, common name, etc.—*E. B. Payson.*

484. BLATTER, E., AND F. HALLBERG. The flora of the Indian desert, (Jodhpur and Jaesalmer). Jour. Bombay Nat. Hist. Soc. 26: 218-246; 525-551; 811-818. 39 pl. 1918-19.—A systematic enumeration with extensive notes and citation of specimens. The following new forms are described: *Farsetia macrantha*, *Cleome brachycarpa* Vahl var. *glauca*, *Gynandropsis pentaphylla* DC. var. *nana*, *Melhanina magnifolia*, *Zizyphus truncata*, *Psoralea odorata*, *Tephrosia incana* Grah. var. *horizontalis*, *T. multiflora*, *T. petrosa*, *Rhynchosia rhombifolia*, *R. arenaria*, *Angoëissus rotundifolia*, *Trianthema pentandra* Linn. var. *rubra*, var. *flava*, *Pulicaria rajputanae*, *Glossocardia setosa*, *Convolvulus densiflorus*, *C. gracilis*, *Aerua pseudotomentosa*. The seventy-eight photographic illustrations of desert scenes and vegetation accompanying this paper are excellent.—E. D. Merrill.

485. BOLZON, P. Ricerche botaniche nel bacino della Dora Baltea. [Botanical researches in the basin of the Dora Baltea.] Nuovo Giorn. Bot. Ital. 25: 309-376. 1918.—The author presents a detailed enumeration of an extensive collection of plants recently made in the valley of the Dora Baltea in northern Italy.—J. M. Greenman.

486. BROWN, WILLIAM H., AND ELMER D. MERRILL. Philippine palms and palm products. Forestry Bur. Philippine Islands Bull. 18. 129 p., 44 pl. 1919.—See Bot. Absts. 6, Entry 533.

487. FARWELL, OLIVER A. Notes on the Michigan Flora, II. Michigan Acad. Sci. Ann. Rept. 21: 345-371. 1919.—Reference is made to several species whose range is known to cross Michigan and which should, therefore, be sought in the state. Among these may be mentioned: *Phegopteris Robertiana* (Hoffm.) A. Br., *Asplenium viride* Huds., *Calamagrostis hyperborea* Lange, *Woodsia glabella* R. Br. and *Calamagrostis Pickeringii* var. *lacustris* (Kearney) Hitch. The author claims that the application of the principles of priority in nomenclature produces the following changes: *Elodea canadensis* Mx. for *philotria canadensis* (Mx.) Britton, *Digitaria* Heist. for *Syntherisma* Walt., *Ginania* Bub. for *Holcus* Authors, *Reboulea* Kunth. for *Eatonia* Authors, *Trichoon* Roth. for *Phragmites* Trin., *Trichophyllum* Ehrh. for *Eleocharis* R. Br., *Iria castanea* (Mx.) n. comb. for *Fimbristylis castanea* (Michx.) Vahl., *Eriophorum* for *Scirpus* in part, and *Phaeocephalum* Ehrh. for *Rhynchospora* Vahl. Changes in family names, in whole or part, are recommended as follows: *Scheuchzeriaceae* becomes *Juncaginaceae*, *Alismaceae* becomes *Alismoidaceae*, *Potamogetonaceae* becomes *Fluvialaceae*, *Valisneriaceae* becomes *Hydrocharidaceae*, *Gramineae* becomes *Graminaceae*, *Polygonaceae* becomes *Persicariaceae*, *Chenopodiaceae* becomes *Blitaceae*, *Leguminosae* becomes *Leguminaceae*, *Rhamnaceae* becomes *Ziziphaceae*, *Tiliaceae* becomes *Tiliataceae*, *Onagraceae* becomes *Corniculataceae*, *Umbelliferae* becomes *Umbellataceae*, *Fagaceae* becomes *Castanaceae*, *Scrophulariaceae* becomes *Ringentaceae*, and *Compositae* becomes *Compositaceae*.—H. T. Darlington.

488. HEMSLEY, W. BOTTING, AND OTHERS. Flora of Aldabra: with notes on the flora of neighboring islands. Bull. Misc. Inf. Kew 1919: 108-153. 1919.—A description of the Aldabra atoll in the Indian Ocean is followed by paragraphs concerning the climate, history of botanical investigation, and relation of its flora to that of some other small islands of the Western Indian Ocean. There is given a systematic enumeration of the vascular plants of Aldabra with the citation of exsiccatae.—E. B. Payson.

489. JEANPERT, ED. Enumération des plantes de Macédoine. [Enumeration of plants of Macedonia.] Bull. Mus. Hist. Nat. [Paris] 25: 662-668. 1919.—This series of papers listing the plants of Macedonia is here concluded.—E. B. Payson.

490. LECOMTE, HENRI. Sur les principaux caractères de structure des bois. [Concerning the principal characters of wood structure.] Bull. Mus. Hist. Nat. [Paris] 26: 166-171. 1920.—See Bot. Absts. 7, Entry 326.

491. MCATEE, W. L. Specific, subspecific, and varietal categories of insects and the naming of them. Entomol. News 31: 46-55, 61-65, 1920.—The author does not regard intergradation a sufficient reason for "lumping" closely related species which exhibit it. Men-

tions plant families Rubiaceae and Caprifoliaceae among examples of groups separated by no absolutely trenchant character. Considers recognition of geographical subspecies a useful feature even though they may intergrade completely where their ranges meet. Discusses also color phases and formation of names. Names should be chosen which are least liable to prove inappropriate, avoiding too free use of those derived from personal or geographical names.—O. A. Stevens.

492. MIYOSHI, MANABU. Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal. [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.] Bot. Mag. Tôkyô 33: 185-188. 1 photo. 1919.—See Bot. Absts. 4, Entry 452.

493. ROCK, JOSEPH F. One government forest. Hawaiian Forester and Agric. 16: 39-40. 3 pl. February, 1919.—A description of Reserve lands at Kulani, Hawaii. The forest is mainly a tree-fern forest made up of the two common types *Cibotium Chamissoi* and *Cibotium Menziesii*. Apart from these, representatives of the genus *Metrosideros* are the most common. Dispersed through the region is also a beautiful native fan palm with large orbicular fruits described by the writer as a new species under the name of *Pritchardia Beccariana*.—Stanley Coulter.

494. SCHONLAND, S. Phanerogamic flora of the divisions of Uitenhage and Port Elizabeth. Mem. Bot. Surv. South Africa [Pretoria] 1: 1-118. 1919.—The present work consists of an annotated list of the flowering plants of the territorial divisions mentioned in the title. Valuable information is recorded on the topography, climate, rainfall, plant formations, etc. The total number of species listed is 2416, of which 2312 are indigenous and 104 are non-native species.—J. M. Greccman.

495. TURRILL, W. B. Contributions to the flora of Macedonia: II. Bull. Misc. Inf. Kew 1919: 105-108. 1919.—A list of species of flowering plants collected by J. M. RUSSELL in Central Greek Macedonia in 1918.—E. B. Payson.

496. TURRILL, W. B. Botanical results of Swedish South American and Antarctic expeditions. Bull. Misc. Inf. Kew 1919: 268-279. 1919.

PTERIDOPHYTES

497. BRAUSE, G. Bearbeitung der von C. Ledermann von der Sepik- (Kaiserin-Augusta-) Fluss-Expedition 1912 bis 1913 und von anderen Sammlern aus dem Papuagebiete früher mitgebrachten Pteridophyten, nebst Uebersicht über alle bis jetzt aus dem Papuagebiet bekannt gewordenen Arten derselben. [Revision of the Pteridophytes collected by Ledermann on the Sepik River Expedition, those brought out by earlier collectors in Papuasias, and a summary of all known species of this group from the Papuan region.] Under the general heading: C. LAUTERBACH, Beiträge zur Flora von Papuasien VII, no. 62. Bot. Jahrb. 56: 30-250. 1920.—This is a very extended treatment of the Pteridophytes of Papuasias, with references and notes on distribution, structure, classification, and nomenclature. The following new varieties, species and combinations are proposed: *Trichomanes papuanum*, *T. concinnum* Mett. var. *emarginata*, *T. subtilissimum*, *T. Ledermannii*, *T. maluense*, *T. Englerianum*, *T. meifolium* Bory var. *linearis* and var. *contracta*, *Hymenophyllum Ledermannii* and var. *nutans*, *H. Herterianum*, *H. Rosenstockii*, *H. sabinifolium* Bak. var. *irregularis* and var. *imbricata*, *Dicksonia Ledermannii*, *D. Hieronymi*, *Cyathea Rosenstockii*, *C. procera*, *C. cincinnata*, *C. subspatulata*, *C. sepikensis*, *C. Ledermannii* and var. *dilatata*, *C. Hunsteiniana* and var. *acuminata*, *Hemitelia Ledermannii*, *Alsophila recurvata*, *A. marginata*, *A. Rosenstockii*, *A. Hunsteiniana*, *A. rubiginosa*, *A. Dielsii*, *A. gregaria*, *A. dryopteroides*, *A. tenuis*, *A. brunnea*, *A. olivacea*, *A. Ledermannii*, *A. scandens*, *Dryopteris Hunsteiniana*, *D. diaphana*, *D. calcarata* (Bl.) O. Ktze. var. *ciliata* (*Aspidium ciliatum* Wall.), *D. subnigra*, *D. coriacea* and var. *elata*, *D. ensipinna* and var. *acuminata*, *D. glaucescens*, *D. alta*, *D. pallescens*, *D.*

fulgens, *D. ledermanni*, *D. notabilis*, *D. Metteniana* Hieron. var. *novoguineensis*, *D. subdigitata*, *D. urophylla* (Wall.) C. Chr. var. *cuspidata* (*Meniscium cuspidatum* Bl.), *D. stellatopilosa*, *D. mutabilis*, *D. micans*, *D. dimorpha*, *D. sepikensis*, *D. hispida*, *D. transversaria* (*Nephrodium transversarium* Brack.), *D. mollis* (Jacq.) Hieron. var. *amboinensis* (*Aspidium amboinense* Willd.), *D. superba*, *D. muricata* and var. *marginata* and var. *obscura*, *D. austera*, *D. oblonga*, *D. farinosa*, *D. Ridleyana* (*Goniopteris rigida* Ridley), *D. hastato-pinnata*, *Aspidium Ledermanni*, *Leptochilus novoguineensis*, *Humata Ledermanni*, *Davallia Ledermanni*, *Lindsaya marginata* and var. *falcata*, *L. Rosenstockii*, *L. Boryana* (*Davallia Boryana* Pr.), *L. Ledermanni*, *L. sepikensis*, *L. obscura*, *Athyrium Ledermanni* Hieron., *Diplazium pseudoshepherdoides* Hieron., *D. Nymani* Hieron., *D. Naumannii* Hieron., *D. Schlechteri* Hieron., *D. Schultzei* Hieron., *D. Schraderi* Hieron., *D. scotinum* Ros. var. *contracta* Hieron., *Asplenium nidus* L. var. *ficifolia* (*Aspl. ficifolium* Goldm.), *A. comosum* Christ var. *subcrispa* Hieron. and var. *furcata* Hieron., *A. Lauterbachii* Christ var. *elongata* Hieron., *A. acrocarpum* Hieron. (*Diplazium acrocarpum* Ros.), *A. caudatum* Forst. var. *Ledermanniana* Hieron., *A. Ledermanni*, Hieron. and var. *lobulata* Hieron., *Blechnum saxatile*, *B. Ledermanni*, *B. deorsolobatum*, *B. Hieronymi*, *D. decorum* and var. *dilatata*, *B. pendulum*, *B. papuanum*, *B. Fraseri* (A. Cun.) Luers. var. *novoguineensis*, *Coniogramme macrophylla* (Bl.) Hieron. var. *undulata* Hieron., *Hypolepis punctata* (Thbg.) Mett. var. *obscura*, *Vittaria rubens* Hieron., *V. Ledermanni* Hieron., *V. Nymani* Hieron., *V. semipellucida* Hieron., *V. latissima* Hieron., *V. exigua* Hieron., *Antrophyum Ledermanni* Hieron., *Drymoglossum Schlechteri* Hieron. & Brause, *Polypodium trichopodium* F. v. Muell. var. *serrato-lobatum*, *P. ornatissimum* Ros. var. *dichotomum*, *P. glanduloso-pilosum*, *P. sepikense*, *P. politum*, *P. eximium*, *P. flagelliforme*, *P. ctenoideum*, *P. celebicum*, Bl. var. *aurita*, *P. dichotomum*, *P. truncata-sagittatum*, *P. redimiens*, *P. balteiforme*, *P. ochrophylum*, *P. ferreum*, *P. cyathisorum*, *P. egregium*, *P. ingens*, *P. alloisorum*, *P. polysorum*, *P. ulotheca*, *Cyclophorus Ledermanni*, *Dryostachyum novoguineense* Brause var. *lanceolata*, *Gleichenia dolosa* (Copel.) C. Chr. var. *virescens* Hieron., *G. linearis* (Burm.) Clarke var. *subferruginea* Hieron., *G. novoguineensis*, *Schizaea papuana*, *Angiopteris evanidostriata* Hieron., *A. Lauterbachii* Hieron., *A. Dahlii* Hieron., *A. undulato-striata* Hieron., *A. crinita* Christ var. *sepikensis* Hieron., *A. Hellwigii* Hieron., *Selaginella Ledermanni* Hieron., *S. Kerstingii* Hieron. var. *brevimucronata* Hieron., *S. Thurnwaldiana* Hieron., *S. Schatteburgiana* Hieron., *S. Bürgeriana* Hieron., *S. Behrmanniana* Hieron., *S. Roesekeana* Hieron., *S. Stolleana* Hieron., *S. gracilis* Moore var. *subbiflora* Hieron., *S. Bamleri* Hieron., *S. Schraderiana* Hieron., and *S. sepikensis* Hieron. Papuasias is one of the richest regions in the world in ferns. The geographical fern region of Papuasias extends to the neighboring islands in all directions, and the limits are given. A table is given of the number of species in each genus common to Papuasias and each of the surrounding groups of islands as well as countries more distant. *Trichomanes* is especially well developed. *Dryopteris* is also highly developed with 112 species. *Polypodium* is the largest genus with 168 species. *Aspidium* and *Polystichum* are poorly represented. The Pterideae are little developed. *Azolla*, *Marsilea*, *Salvinia*, and *Pilularia* have as yet not been found. *Botrychium* is not known, though *Ophioglossum* is moderately represented. *Selaginella* is represented by 58 species.—K. M. Wiegand.

498. BRAUSE, G. Über die von C. R. W. K. van Alderwerelt van Rosenburgh neu aufgestellte Gattung *Thysanobotrya*. [On van Alderwerelt van Rosenburgh's new genus *Thysanobotrya*.] *Hedwigia* 61: 401. 1920.—GEPP described a new fern from Dutch New Guinea as *Polybotrya arfakensis*. VAN ROSENBURGH separated this under a new generic name as *Thysanobotrya arfakensis* (Gepp) v.A.v.R. The present author finds that the original description and figures correspond to *Alsophila biformis* Ros. He considers *Alsophila* the proper genus for this plant and sees no reason for the creation of a separate genus *Thysanobotrya*.—K. M. Wiegand.

499. HIERONYMUS, G. Über *Cheilanthesis* Hieron., eine neue Farngattung. [*Cheilanthesis*, a new genus of ferns.] *Notizbl. Bot. Gart. Berlin* 7: 406-409. 1920.—The genus differs from *Cheilanthes* in its dorsiventral spores; from *Hypolepis*, to which it is closely related in its ascending rhizome and fascicled leaves. Although based on *Cheilanthes straminea* Brause, no transfer of that species to the new genus is made.—H. A. Gleason.

500. HOLM, THEO. Internal glandular hairs in *Dryopteris*. *Rhodora* 22: 89-90. 2 fig. 1920.—See Bot. Absts. 6, Entry 1183.

501. HOUSE, HOMER D. The Genus *Aetopteron*, Ehrhart. *Amer. Fern Jour.* 10: 88-89. 1920.—The author revives the name of *Aetopteron* of EHRHART to replace *Polystichum* and makes the following new combinations: *Aetopteron aculeatum* (*Polystichum aculeatum* L.), *A. acrostichoides* (*Nephrodium acrostichoides* Michx.), *A. Braunii* (*Aspidium Braunii* Spenner), *A. Lemmoni* (*Polystichum Lemmoni* Underw.), *A. lonchites* (*Polypodium lonchites* L.), *A. munitum* (*Aspidium munitum* Kaulf.), *A. scopulinum* (*Ascidium aculeatum* var. *scopulinum* D. C. Eaton).—F. C. Anderson.

502. WEATHERBY, C. A. Varieties of *Pityrogramma triangularis*. *Rhodora* 22: 113-120. 1920.—The author recognizes three geographic varieties in addition to the typical *P. triangularis*. The separation is based on the presence or absence of glands on the lamina and stipe, and on the character of these glands when present. A key to the varieties and the bibliography of each is given.—James P. Poole.

SPERMATOPHYTES

503. ANONYMOUS. Decades Kewenses. Decades XCII & XCIII. *Bull. Misc. Inf. Kew* 1919: 221-231. 1919.—The following species are described as new: *Aconitum funiculare* Stapf, *Indigofera Barberi* Gamble, *Erythrina mysorensis* Gamble, *Smithia Venkobarrowii* Gamble, *Desmodium wynaadense* Bedd., *Vigna Bourneae* Gamble, *Rosa Saundersiae* Rolfe, *Bruguiera Hainesii* C. G. Rogers, *Sonerila pulneyensis* Gamble, *Memecylon flavescentes* Gamble, *M. Lawsonii* Gamble, *M. Lushingtonii* Gamble, *M. madgolense* Gamble, *M. sisparensense* Gamble, *Pimpinella pulneyensis* Gamble, *Schefflera Bourdillonii* Gamble, *S. bengalensis* Gamble, *Linociera Parkinsonii* Hutchinson, *Sarcococca vagans* Stapf, *Chrysopogon setifolius* Stapf.—E. Mead Wilcox.

504. ANONYMOUS. Decades Kewenses. Decas XCIV. *Bull. Misc. Inf. Kew* 1919: 403-407. 1919.—The following species are described as new: *Calathodes oxycarpa* Sprague, *Osbeckia travancorica* Bedd., *Oldenlandia Bourdillonii* Gamble, *O. eulata* Gamble, *O. Ramarrowii* Gamble, *O. villosostipulata* Gamble, *O. wynaadensis* Gamble, *Ophiorrhiza Barberi* Gamble, *O. codensis*, *O. pylkarensis* Gamble.—E. Mead Wilcox.

505. ANONYMOUS. Diagnoses Africanæ: LXXII. *Bull. Misc. Inf. Kew* 1919: 263-267. 1919.—The following species are described as new: *Kalanchoe densiflora* Rolfe, *Anisophyllaea tomentosa* Rolfe, *Scyphosyce pandurata* Hutchinson, *Kniphofia Snowdeni* C. H. Wright, *Eriocaulon recurvifolium* C. H. Wright, *Brachiaria nana* Stapf, *Panicum uvulatum* Stapf, *P. epacridifolium* Stapf, *P. bambusiusculum* Stapf, *Rutenbergia Usagarae* H. N. Dixon.—E. Mead Wilcox.

506. BLATTER, E., AND F. HALLBERG. A revision of the Indian species of *Rotala* and *Ammannia*. Part II. *Jour. Bombay Nat. Hist. Soc.* 26: 210-217. 1918.—Completed from the preceding volume, the second part covering six species of *Ammannia*; no new names appear.—E. D. Merrill.

507. BRIQUET, J. Decades plantarum novarum vel minus cognitarum. [Decades of new or little-known plants.] *Annuaire Conservatoire et Jard. Bot. Genève* 20: 342-427. 1919.—This is the twenty-sixth of a series and includes the families from Celastraceae to Valerianaceae. The new names are: *Maytenus pilcomayensis* (Paraguay, Rojas 401), *M. Hassleri* (Paraguay, Hassler, 1342), *M. Mathewsii* (Peru, Mathews), *M. Pavonii* (Peru, Pavon 53), *M. evonymoides* var. *Minarum* (Brazil, Glaziou 12538, 13665) and var. *pyncnodonta* (Paraguay, Hassler, 7358), *M. retusa* (*Celastrus retusus* Poir.), *M. durifolia* (Peru, Pavon 564), *M. Jamesonii* (Ecuador, Jameson 222), *M. vexata* (*M. myrsinoides* Urb. not Reissek), *M. Trianae* (*M. buxifolius* Tr. & Pl. not Griesb.), *M. Schottii* (*M. repanda* Reiss. not Turcz.), *M. Lorentzii*

(Argentina, Lorentz 1198), *M. paraguariensis* (Paraguay) var. *genuina* (Hassler 2564) and var. *grandifolia* (Rojas 508), *M. Fendleri* (Venezuela, Fendler 215), *M. ebenifolia* var. *Poeppigii* Brazil, Poeppig 3008) and var. *Ulei* (Brazil, Ule 6084), *M. macrocarpa* (*M. multiflora* Loesen., not Reissek), *M. longipes* (Colombia, Smith 454), *M. laurina* (Brazil, Spruce 2284), *M. Sprucei* (Brazil, Spruce 3970), *M. tarapotensis* (Peru, Spruce 4329), *M. controversa* (Brazil, Glaziou 13666), *M. Blanchetii* (Brazil, Blanchet 3780), *Columellia Mathewsii* (Peru, Mathews), *Clethera Broadwayana* (Trinidad, Broadway 2594), *C. Schlechtendalii* (Mexico, Schiede & Deppe), *C. Galeottiana* (Mexico, Galeotti 1820), *C. confusa* (Mexico, Pringle 2425). *C. guadalajarensis* (Mexico, Pringle 2502), *C. Smithii* (Columbia, Smith 2422), *C. angustinensis* (Venezuela, Funk 163), *Callisthene durifolia* (Brazil, Claussen), *C. Clausseniana* (Brazil, Claussen), *C. robusta* Briq. & Glaz. (Brazil, Glaziou 20679), *C. Glazioui* (Brazil, Glaziou 20681), *C. mucronata* (Brazil, Glaziou 20680), *C. Hassleri* (Paraguay, Hassler 10638), *Qualea obtusata* (Brazil, Spruce 3341), *Vochisia alternifolia* Briq. & Galz. (Brazil, Sello), *Vochisia Haenkeana* var. *genuina* (Peru, Haenke), var. *Sprucei* (Spruce 4078) and var. *microphylla* (Mathews 1650), *V. grandis* var. *Douvillei* (Brazil, Douville), *V. stenophylla* (Brazil, Glaziou 13807), *Hypericum connatum* var. *obscurum* (Brazil, Czermak. & Reineck 590), var. *paraguayense* (Bolivia, Fiebrig. 2361) and var. *Fiebrigii* (Bolivia, Fiebrig 2361 p. p.), *H. cordiforme* var. *genuinum* (Brazil, Guillemain 315), var. *Hilairei* (var. β St. Hil.) and var. *Glazioui* (Brazil, Glaziou 14534), *H. Stolzii* (Nyassa, Stolz 2223), *Hydrangea Schlimii* (Columbia, Schlim 1139), *H. platyphylla* (Colombia, Linden 894), *H. Trianae* (Columbia, Triana), *H. Goudotii* (Colombia, Goudot), *H. durifolia* (Colombia, Funck & Schlim 1393), *H. Oerstedii* (*H. peruviana* Hemsl. not Moric.) *H. Preslii* (*Sarcostyles peruviana* Presl not *H. peruviana* Moric.), *H. ecuadorensis* (Ecuador, Spruce 5058), *H. umbellata* (*Cornidia umbellata* Ruiz. & Pav.), *H. Sprucei* (Colombia, Spruce 4328), *H. mathewsii* (Peru, Mathews), *H. tarapotensis* (Peru, Spruce 4349), *Escallonia illinita* var. *pubicalicina* (Argentina, Bâcle), var. *angustifrons* (Chile, Bertero 984), var. *eu-illinita* (*E. illinita* Presl), *E. pycnantha* (Chile, Bridges), *E. modesta* (Chile, Bridges), *Ilex Merrillii* (Philippines, Merrill 881), *Eucryphia lucida* (*Carpodontos lucida* Labill.), *Sollya fusiformis* (*Billardiera fusiformis* Labill.), *Turpinia heterophylla* (*Staphylea heterophylla* Ruiz. & Pav.), *Sorindeia Goudotii* (Madagascar, Goudot), *Valeriana Bornmuelleri* (Brazil, Bornmüller 198). A correction to page 80 is, *Loeflingia Vaucheri* Briq. is *L. micrantha* var. *Vaucheri* Briq.—A. S. Hitchcock.

508. CAMUS, AIMÉE. *Espèces et variétés nouvelles de Graminées de l'Asie Orientale*. [New species and varieties of Gramineae from eastern Asia.] Bull. Mus. Hist. Nat. [Paris] 25: 669-672. 1919.—The following varieties, subspecies, and species are described as new: *Pollinia phaeotrix* Hack. var. *genuina*, *Pollinia phaeotrix* Hack. var. *aurea*, *P. phaeotrix* Hack. var. *tonkinensis*, *Miscanthus nudipes* Hack. subsp. *yunnanensis*, *M. japonicus* Anders. var. *formosanus*, *Cymbopogon Martini* Stapf var. *annamensis*, *Themeda arguens* Hack. var. *cochinchinensis*, *T. ciliata* Hack. var. *breviaristata*, *Isachne Eberhardtii*, *Panicum sarmentosum* Roxb. var. *mekongense*, *Leptochloa filiformis* R. & S. var. *subuniflora* G. & A. Camus, *Dendrocalamus sericeus* Munro var. *latifolius* G. & A. Camus, and *Arundinaria ciliata*.—E. B. Payson.

509. CAMUS, AIMÉE. *Note sur le Vetiveria zizanioides* Stapf (Graminées). [Note on *Vetiveria zizanioides* Stapf (Gramineae).] Bull. Mus. Hist. Nat. [Paris] 25: 673-674. 1919.—A key is given to the four recognized varieties of *Vetiveria zizanioides* with notes on distribution and citation of specimens. *V. zizanioides* Stapf var. *tonkinensis* is described as new to science.—E. B. Payson.

510. CORBISHLEY, A. G. *Nectaropetalum zuluense*. Bull. Misc. Inf. Kew 1919: 449-450. 10 fig. 1919.—The plant previously known as *Erythroxyton zuluense* Schönk. is found to be a true species of *Nectaropetalum*, and so becomes *N. zuluense* (Schönk.) Corbishley.—E. Mead Wilcox.

511. COULTER, J. M. *Cactaceae*. [Rev. of: BRITTON, N. L., AND J. N. ROSE. *The Cactaceae*. Carnegie Inst. Washington Publ. 248. 236 p., 36 pl., 302 fig. 1919.—(See Bot. Absts. 3, Entry 1824:)] Bot. Gaz. 68: 391. 1919.

512. DAVIDSON, ANSTRUTHER. [Without title.] Bull. Southern California Acad. Sci. 19: 10-12. 1920.—*Linanthus saxiphilus*, *Draba saxosa* and *Hutchinsia californica* are described as new. There are also notes on certain species of *Lupinus* and *Linanthus*.—*Roxana Stinchfield Ferris*.

513. EBERHARDT, PH. Sur une variété indochinoise du *Quisqualis indica* (Combrétacées). [On an Indo-Chinese variety of *Quisqualis indica* (Combretaceae).] Bull. Mus. Hist. Nat. [Paris] 25: 675-676. 1919.—A variety, *Quisqualis indica* L. var. *annamensis*, is described as new to science.—*E. B. Payson*.

514. EHINGER, M. *Odontoglossum Rossii* Lindl. Orchis 13: 33-35. 1919.—Notes on this species and some of its varieties are given with an illustration of the species.—*E. B. Payson*.

515. ENGLER, A. Sterculiaceae africanae. VI. [Sterculiaceae of Africa. VI.] Bot. Jahrb. 55: 350-380. 1919.—A contribution under the general heading "Beiträge zur Flora von Afrika. XLVII. herausgegeben von A. Engler," continued from Bot. Jahrb. 45: 339. Three genera, *Melhania*, *Hermannia*, and *Cola* are treated, the main portion of the paper being an extended elaboration of the genus *Hermannia*. Since K. SCHUMANN's monograph of the African Sterculiaceae in 1900 the explorations in the Transvaal and other portions of South Africa have contributed a vast amount of material. Especially rich in this genus have been the collections of DINTER in Dutch-Southwest-Africa, RANGE and SCHAFER in Namaqualand, and SCHLECHTER in the Transvaal and Namaqualand. In 1907 ENGLER described eleven species. In the present paper, begun in 1918, about forty species are described as new, three of which are proposed by DIELS and four by SCHLECHTER. ENGLER has retained most of SCHUMANN's subgenera as sections but SCHUMANN's subdivision of *Euhermannia* he could not retain; rather HARVEY's groups in this subdivision were found to be more natural though they are here increased to seven. The section *Acicarpus* has been much elaborated beyond the treatment of HARVEY. The systematic subdivisions of *Hermannia* have natural geographic ranges. ENGLER's sections are as follows: (1) *Mahrenia*, north and east Africa, (2) *Euhermannia*, center of development southwestern Cape Colony, (3) *Scaphiostemon*, Damaraland, (4) *Acicarpus*, Abyssinia to the Transvaal and Namaqualand, and (5) *Mahernia*, mainly South Africa. The general distribution of the genus shows it to be very old and long established in its present range. That it dates back to a time when the continents probably had a different configuration than at present is indicated by the occurrence of one endemic species in South Australia and three in Texas and Mexico. Fifty-five species of *Hermannia* are treated in the paper. The following species, varieties, and combinations are new: Section *Mahrenia*; *H. Uhligii* Engl. Massai Steppes. Section *Euhermannia*; *H. glabripetala*, Engl. Little Namaqualand; *H. cinerascens* Engl., Little Namaqualand; *H. Juttae* Dinter & Engl., Great Namaqualand; *H. melissifolia* Engl., S. W. Africa; *H. prismatocarpoides* Engl., East Cape Colony; *H. patellicalyx* Engl., Great Namaqualand; *H. arida* Diels, Southwest Cape Colony; *H. membraniflora* Schltr., Southwest Cape Colony; *H. myrioclada* Diels, Southwest Cape Colony; *H. subsquamulata* Engl., Southwest Cape Colony; *H. Bachmannii* Engl., Southwest Cape Colony; *H. minutiflora* Engl., Little Namaqualand to Damaraland; *H. macra* Schltr., Little Namaqualand; *H. longiramosa* Engl., North Hereroland. Section *Scaphiostemon*; *H. tenuipes* Engl., southwest Africa. Section *Acicarpus*; *H. longicornuta* Engl., Great Namaqualand; *H. spinulosa* Engl., Great Namaqualand; *H. deserticola* Engl., Great Namaqualand; *H. intricata* Engl., Great Namaqualand; *H. aspericaulis* Dint. & Engl., Little Namaqualand; *H. modestus* (Ehrenb.) Planch. var. *elatior* K. Schum. subvar. *virgatissima* Engl., Damaraland; subvar. *brevicornis* Engl., Transvaal; subvar. *macropetala* Engl., Transvaal, Damaraland and Hereroland; subvar. *mediipetala* Engl., Damaraland; var. *tsunebensis* Engl., Hereroland; *H. Stuhlmannii* Engl., East Africa; *H. pseudo-Mildbraedii* Dint. & Engl., Damaraland; *H. sideritifolia* Engl., Transvaal; *H. Séitziana* Engl., Great Namaqualand; *H. glandulosissima* Engl., Damaraland; *H. teitensis* Engl., Kilimanjaro; *H. tomentosus* (Turcz.) Schinz Msc. var. *brevifolia* Engl., Damaraland; *H. Seineri* Engl., north Hereroland, and var. *latifolia* Engl. Section *Mahernia*; *H. sparsipilosa* Engl., Transvaal; *H. pulchella* L. var. *picta* n. comb., Great Namaqualand; *H. bicolor* Dint.

& Engl., Damaraland; *H. Wilsnii* Engl., Natal; *H. hantamensis* Engl., Little Namaqualand; *H. coccocarpoides* Engl., Transvaal; *H. collina* Schltr., Little Namaqualand; *H. Meyeri* Engl., Little Namaqualand; *H. leucantha* Schltr., Little Namaqualand; *H. Vetteri* Engl., North Hereroland; *H. linnaeopsis* Dint. & Engel., Damaraland; *H. chloroleuca* Diels, north-west Cape Colony; *H. Medleyi* Engl., Natal; *H. Dieterlenii* Engl., Highland of southeast Africa; *H. Thodei* Engl., Highland of southeast Africa. Besides the new species and varieties of *Hermannia*, there are a few others as follows: *Melhania Dinteri* Engl., North Hereroland; *M. ferrugineoides* Engl., North Hereroland; *Cola subglaucescens* Engl., South Kamerun; *C. edeensis* Engl. & Krause, South Kamerun; and *C. Tessmannii* Engl. & Krause., forest province of Guinea.—K. M. Wiegand.

516. ENGLER, A. *Guttiferae africanae*. III. [Guttiferae of Africa. III.] Bot. Jahrb. 55: 381-396. 1919.—A contribution under the general heading "Beiträge zur Flora von Afrika. XLVII, herausgegeben von A. Engler," continued from Bot. Jahrb. 45: 339. The tropical African genus *Psorospermum* Spach is greatly in need of revision. In Oliver's "Flora of Tropical Africa" only four species were described. Besides these, SCHWEINFURTH described one, and ENGLER three, and C. H. WRIGHT one. In the present paper thirteen new species and two new varieties are proposed as follows: *P. Baumannii*, Togo, and var. *Afzelianum*, Sierra Leone; *P. Baumii*, Kunene-Kubango-Land; *P. aurantiacum*, Kamerun; *P. Staudtii*, Kamerun; *P. parviflorum*, Kamerun; *P. Kerstingii*, Togo; *P. laxiflorum*, Togo; *P. densipunctatum*, Kamerun; *P. Mechowii*, Angola; *P. adamaueense*, Soudan Park-steppe Province; *P. Ledermannii*, Soudan Park-steppe Province, and var. *Doeringii*, Togo; *P. glaucum*, Soudan Park-steppe Province; *P. suffruticosum*, Soudan Park-steppe Province. Other new species described are as follows: *Haronga scandens*, Kamerun; *Garcinia Livingstonii* T. And. var. *pallidinervia*, Kondeland; *G. Stolzii*, north Nyassaland; *G. ubangensis*, Soudan Park-steppe Prov.; *G. Chevalieri*, French Guinea; *G. viridiflava*, Kamerun; *G. beniensis*, Lower Prov. of Cent. Africa; *G. mbulwe*, North Nyssaland; *G. arbuscula*, Kamerun; *G. quadrangula*, Kamerun; *G. tibatisensis*, Soudan Park-steppe Prov.; *G. tenuipes*, Kamerun; *G. tschapensis*, Soudan Park-steppe Prov.; *G. Danckelmanniana*, Soudan Park-Steppe Prov.; *G. ndongensis*, Kamerun; *G. nitidula*, Kamerun; *G. Buchneri*, Angola; *Pentadesma Kerstingii*, Soudan Park-steppe Province, and Guinea forest Province.—K. M. Wiegand.

517. ENGLER, A. *Violaceae africanae*. IV. Zur Kenntnis der afrikanischen Hybanthus-Arten. [Violaceae of Africa. IV. Toward a knowledge of the African species of Hybanthus.] Bot. Jahrb. 55: 397-400. 1919.—A contribution under the general heading "Beiträge zur Flora von Afrika, XLVII." A key to the African species is given, and nine species are listed. The new species, combinations, and varieties are: *H. enneaspermum* (L.) F. v. Muell. var. *serratus*, Transvaal; *H. densifolius*, southwest Africa; *H. Hildebrandtii*, North Somaliland; *H. hirtus* (*Jonidium hirtum* Klotzsch); *H. hirtus* var. *Klotzschii*, Mozambique, Zanzibar; *H. hirtus* var. *glabrescens*, Somaliland, Zanzibar, Mozambique, Katanga; *H. Fritzscheanus*, Huilla; *H. caffer* (*Jonidium cafferum* Sond.); *H. caffer* var. *angustifolius*; *H. nyassensis* (*Jonidium nyassense* Engl.); *H. capensis* (*Jonidium capense* Roem. & Schult.); *H. thymifolius* (*Jonidium thymifolium* Presl).—K. M. Wiegand.

518. FUCHS, ALFRED. *Orchis Traunsteineri* Saut. Erster Teil. Ber. Naturw. Vereins Schwaben u. Neuburg 42: 3-174. 47 fig. 1919.—The author gives a full account of *Orchis Traunsteineri*, a member of the *Dactylorchis* group occurring in Central Europe. He divides this species, as ordinarily understood, into two species, the true *O. Traunsteineri* of Sauter and *O. pseudo-Traunsteineri*, which he describes as new. Under the second species he distinguishes and describes in detail the following new subspecies: *bavaricus*, *suevicus*, *gabretanus*, *gennachiensis*, *Hoepfneri*, *eifliacus* and *Koningweenianus*. To these subspecies he ascribes a hybrid origin, regarding them as more or less complex crosses between *O. Traunsteineri* and certain other members of the *Dactylorchis* group, such as *O. incarnatus* L. and *O. latifolius* L. The subspecies *suevicus*, for example, he expresses by the formula, (*Orchis incarnatus* + *latifolius*) + *Orchis Traunsteineri*; some of his other formulas are even more complicated. In the course of his discussions he describes the following new races: *O. incar-*

natus race *traunsteinerifolius* and *O. maculatus* race *falcatus*. The illustrations depict details of floral structure and especially variations in the form and lobing of the lip. In connection with the various plants described the author calls attention to the distinctive features of their habitats and lists the species, both bryophytes and spermatophytes, which are associated with them.—A. W. Evans.

519. GUILLAUMIN, A. Contribution à la Flore de la Nouvelle-Calédonie. [Contribution to the Flora of New Caledonia.] Bull. Mus. Hist. Nat. [Paris] 25: 645-652. 1919.—Species are listed with the citation of specimens made by various collectors. *Tapeinosperma Pen-nelii* is described as a species new to science.—E. B. Payson.

520. HAINES, H. H. Indian species of *Carissa*. Indian Forester 45: 375-388. Pl. 17-20. 7 fig. 1919.—Five species of *Carissa* are known in India, and a botanical description is given of each, with a key for their identification.—E. N. Munns.

521. HALL, CUTHBERT. On a new species or form of *Eucalyptus*. Proc. Linnean Soc. New South Wales 43: 747-749. Pl. 75. 1918.—*Eucalyptus Marsdeni*, forma vel sp. nov. is described in regard to its seedling, juvenile, and mature leaves; inflorescence; fruit; bark (unusual for a *Eucalypt*, to be classed with the stringy-barks, yet laminated with a sort of ochreous deposit on the outer surface of each layer, branch bark smooth and greyish, a half bark); timber, which is light brown, straight grained, has few gum-veins and works well, resembling *E. viminalis* in physical characters. The only known tree has been cut. The oil from leaves and terminal branches is thick and viscous, and its characteristics are discussed in detail.—Eloise Gerry.

522. HANSEN, W. Die Bestimmungen der echten Gräser nach äusseren Merkmalen. [The determination of the true grasses according to their external characters.] Illustrierte Landw. Zeitg. 39: 266. 1919.—For the identification of the grasses the writer presents a plan based primarily on the form of the inflorescence.—John W. Roberts.

523. HASSLER, E. Bromeliacearum paraguariensium conspectus. [A conspectus of the Bromeliaceae of Paraguay.] Annuaire Conservatoire et Jard. Bot. Genève 20: 268-341. 2 fig. 1919.—There is a short introduction, a technical description of the genera and species, and an index. Full notes with synonymy and bibliography are given. The genera are *Bromelia*, *Acanthostachys*, *Ananas*, *Aechmea*, *Billbergia*, *Deuterocohnia*, *Dyckia*, *Vriesia*, *Tillandsia*. The new names are: *Aechmea polystachia* var. *myriophylla* (A. *myriophylla* Morr.), A. (subg. *Platyaechea*) *platyphylla* (Santo Thomas, Sierra de Amambay, Hassler 11283 leg. Rojas), A. *ampullacea* var. *typica* (Yaguarazapá, Fiebrig 5431) and var. *longifolia* (Yhú, Hassler 9691), *Billbergia magnifica* var. *acutisepala* (Esperanza, Hassler 10726), *Deuterocohnia paraguariensis* (Cerro Margarita, Hassler 11098), *Dyckia ferox* f. *australis* (D. *ferox* Mez), f. *vulgaris* (Cerro-hú, Hassler 1447 et al), subsp. *hamosa* (D. *hamosa* Mez), D. *commixta* (Tobaty, Chod. & Vischer 97), D. *microcalyx* var. *inermis* (Villa Rica, Hassler 8787), var. *micrantha* (Alto Paraná, Fiebrig 5941), D. *distachya* (Fiebrig 5648), f. *induta* (Fiebrig 5824), D. *tobatiensis* (Tobaty, Hassler 2099), D. *Hassleri* f. *gracilis* (Hassler 1120), var. *arenosa* (Cerro Corá, Hassler 10500), var. *subinermis* (Hassler 10500a), subsp. *basispina* (Esperanza, Hassler 10884), var. *montana* (Cerro Corá, Hassler 9789), D. *vestita* (Centurion, Fiebrig 5311), D. *Nissionum* var. *breviflora* (San Ignacio, Hassler 142), D. *insignis* (Centurion, Fiebrig 4615), var. *macrantha* (Centurion, Fiebrig 5310a), var. *obtusiflora* (Centurion, Fiebrig 5310), *Vriesia glutinosa* var. *viridis* (Santo Tomas, Hassler 3768), *Tillandsia stricta* var. *paraguariensis* (Hassler 3286 p.p.), T. *streptocarpa* var. *filifolia* (Balansa 615), T. *decomposita* var. *minor* (Hassler 3683), T. *confusa* (Lake Ypacaray, Hassler 3101), var. *saxatilis* (Hassler 3416), T. *arhiza* var. *rupestris* (T. *rupestris* Mez), T. *bandensis* var. *intermedia* (Santa Elisa, Hassler 2778), T. *tricholepis* var. *argentea* (Hassler 8517).—A. S. Hitchcock.

524. HOWARTH, W. O. *Festuca rubra* near Cardiff: a taxonomic morphological, and anatomical study of three sub-varieties of *Festuca rubra* L., subsp. *eu-rubra* Hack., var. *genuina* Hack., growing near Cardiff, S. Wales. New Phytol. 18: 263-286. 14 fig. 1919.—A detailed

study of the subvarieties *grandiflora* (Hack.), *tenuifolia* (new), and a third probably corresponding to HACKEL's *glaucescens*. The new subvariety is xerophytic and generally associated with halophytic conditions; fairly densely caespitose; rhizomes short and more or less curved and ascending from the base; leaves slender and dark glaucous green, with a "bloom;" panicle more compact than in *grandiflora*; internodes rough; spikelets fewer, but the individual glumes large and as numerous as in *grandiflora*, with shorter awns.—I. F. Lewis.

525. JÖRGENSEN, E. *Ajuga pyramidalis* × *reptans*. Bergens Mus. Aarb. (Naturh. Raekke) 1917-1918. 4 p. 1918.—At Nygaard Park in Bergen, specimens of *Ajuga reptans*, rare in Norway, were found with the common *A. pyramidalis*. Their hybrid was also found. The species and hybrid are described.—A. Gundersen.

526. JÖRGENSEN, E. Die Euphrasia-Arten Norwegens. [Euphrasia species of Norway.] Bergens Mus. Aarb. (Naturh. Raekke) 1916-1917: 5-337. 11 maps, 14 tables, 54 fig., bibliography. 1919.—Detailed discussion of characters and distribution of Norwegian species. These differ in degree, not in definite characters, representing an almost inextricable jumble answering the Mendelian splitting up of hybrids. Numerous new forms are described; one new species, *E. hyperborea*. In the usual sense of species there are only two, *E. salisburgensis*, and all other forms taken together. Summary given in English.—A. Gundersen.

527. KOIDZUMI, GENITI. Contributiones ad Floram Asiae Orientalis. [Contributions to the flora of eastern Asia.] Bot. Mag. Tôkyô 33: 217-223. 1919.—The author describes as new, *Lactuca grandicollis*, *Senecio muninensis*, *Pyrus Yoshinoi*, *Salix paludicola*, *S. Hidewoi*, *S. tsukoshiana*, *Cirsium Yoshizawae*, *Campanula microdonta*, with notes on other Japanese plants, and gives as a new combination, *Zanthoxylon inerme* (Rehd. & Wils.) Koidz.—*Rozana Stinchfield Ferris*.

528. LÁZARO E IBIZA, B. Revisión crítica de las especies peninsulares del género *Viola*. [A critical revision of the peninsular species of the genus *Viola*.] Revista R. Acad. Cien. Exactas, Fisicasy Nat. [Madrid] 17: 249-280, 391-421. 5 pl. 1919.—The species are divided into 3 groups and 8 sections. The following new species and varieties are described: *Viola longifolia*, *V. polustris* var. *genuina*, *V. odorata* var. *genuina*, *V. hirta* var. *genuina*, *V. biflora* var. *uniflora*, *V. canina* var. *genuina*, *V. sylvestris* var. *genuina*, *V. rupestris* var. *genuina*, *V. cornuta* var. *genuina*, *V. lactea* var. *genuina*, *V. parvula* var. *genuina*, and *V. lutea* var. *genuina*.—L. L. Harter.

529. MIETHE, E. *Cattleya superba* Schomb. Orchis 13: 10-12. 1919.—This species is here redescribed and illustrated.—E. B. Payson.

530. PELLEGRIN, FRANÇOIS. Note sur le Banda rouge et sur un Ombéga du Gabon. [Concerning the red Banda and an Ombéga of Gabon.] Bull. Mus. Hist. Nat. [Paris] 25: 653-654. 1919.—*Sindora Klaineana* Pierre is described as new to science. It is known locally as the red Banda. Ombéga is the vernacular term applied to *Entandrophragma rufa* Chevalier.—E. B. Payson.

531. PONZO, ANTONIO. Sul genere *Acacia*. [The genus *Acacia*.] Nuovo Gior. Bot. Ital. 25: 271-307. 1918.—A historical review of the position and limitation of the genus, a critical consideration of the essential and secondary taxonomic characters, and a regrouping and description of the species. The following subdivisions are recognized: (1) *Phyllodinae* with 29 species, (2) *Botryocephalae* with 4 species, (3) *Pulchellae* with one species, and (4) *Gumiferae* with 10 species.—Ernst Artschwager.

532. PRAIN, D., AND I. H. BURKILL. "*Dioscorea sativa*." Bull. Misc. Inf. Kew 1919: 339-375. 1919.—After an exhaustive enquiry into the aggregate that LINNAEUS included under the name *Dioscorea sativa*, it is shown that that name is one which can not be used.—E. Mead Wilcox.

533. R., J. K. [Rev. of: *Standard Cyclopaedia of Horticulture*. Vol. VI. S-Z with Supplement p. 3043-3639, fig. 3516-4056. Edited by L. H. Bailey. 1917.] *Jour. Botany* 57: 198-200. 1919.

534. SCHELLENBERG, G. *Connaraceae africanæ*. III. [Connaraceae of Africa. III.] *Bot. Jahrb.* 55: 436-456. 1919.—The paper is made up of the descriptions of new species, and the designation of new combinations found necessary in the preparation of a monograph of the family soon to appear in "Das Pflanzenreich." The new species are: *Cnestis liberica*, Liberia; *C. Dinklagei*, Liberia; *C. cinnabarina*, Kamerun; *C. longiflora*, Lagos; *C. leucantha* Gilg, Kamerun; *C. calantha*, Kamerun; *C. gabunensis*, Gabun; *C. Zenkeri*, Kamerun; *C. macrophylla* Gilg, Kamerun; *Manotes Tessmannii*, Gagun; *M. Zenkeri* Gilg, Nigeria, Kamerun, etc.; *M. rosca*, Gabun and Kamerun; *M. rubiginosa*, Angola; *M. Soyauzii*, Loango; *Paria calophylla* Gilg, Kamerun; *P. Zenkeri*, Kamerun; *P. cinnabarina*, Kamerun; *P. lancea*, Kamerun; *Byrsocarpus Ledermannii*, Kamerun; *B. tomentosus*, Dutch East Africa, Rhodesia, etc.; *B. papillosus*, Kamerun; *Santaloides urophyllum*, Kamerun; *Jollydora glandulosa*, Kamerun. New combinations are as follows: *Cnestis Mannii* (*Connarus Mannii* Baker); *C. pseudoracemosa* (*Connarus pseudoracemosus* Gilg); *Roureaopsis Thonneri* (*Rourea Thonneri* De Wild.); *Spiroctalum Reynoldsii* (*Connarus Reynoldsii* Stapf); *Santaloides gudjuanum* (*Rourea gudjuana* Gilg); *S. splendidum* (*Rourea splendida* Gilg); *S. bamangense* (*Rourea bamanganense* De Wild.). Notes are given on *Paxia myriantha* (Baill.) Pierre, *Byrsocarpus orientalis* Baill., *B. Poggeanus* (Gilg) Schellenb., and *B. maximus* Bak.—K. M. Wiegand.

535. SCHELLENBERG, G. Ueber die Connaraceen-Gattung *Jaundea* Gilg. [On the genus *Jaundea* Gilg of the family Connaraceae.] *Bot. Jahrb.* 55: 457-463. 1919.—GILG described in 1895 a genus *Jaundea* based on a plant which he named *J. Zenkeri* collected by ZENKER near the station Jaunde in Kamerun. The new genus was included in *Natur. Pflanzenfam.* where in one place it was spelled *Yaundea*, an unjustifiable spelling of the word. GILG admitted later that he was deceived by the young inflorescence and the position of the anthers in the ZENKER material, and that his name should be a synonym of *Rourea pseudobaccata*. Later SCHELLENBERG in his inaugural dissertation made *Jaundea* a section of *Byrsocarpus*; but he now recognizes it as a genus containing the original plant of GILG, but having different characters and limits. As thus understood it contains a portion of the species originally ascribed by SCHELLENBERG to *Jaundea* as a section of *Byrsocarpus*. The unimportance of certain biological characters from a taxonomic point of view is discussed, as for instance the appearance of the flowers with or after the leaves. The nervation of the leaf and the type of inflorescence are important in separating *Jaundea* and *Byrsocarpus*. A diagnosis of the genus is given and the characters which separate it from *Byrsocarpus* are tabulated. The species and forms included are as follows: *Jaundea Baumannii* (*Rourea Baumannii* Gilg); *J. congolana*; *J. Leskrauwaetii* (*Rourea Leskrauwaetii* De Wild.); *J. monticola* (*Rourea monticola* Gilg); *J. Odoni* (*Rourea Odoni* De Wild.); *J. pseudobaccata* (*Rourea pseudobaccata* Gilg); *J. pubescens* (*Connarus pubescens* Baker); *J. pubescens* forma *glabrata*.—K. M. Wiegand.

536. SCHLECHTER, R. Die Gattung *Cochlioda* Ldl. [The Genus *Cochlioda* Ldl.] *Orchis* 13: 3-10. 1919.—(Concluded.) An extensive generic description is followed by a key to the five recognized species of *Cochlioda*. Specific descriptions, synonymy, and the citation of specimens are included. *Symphyglossum* is described as a genus new to science, and to it are assigned the following species: *S. sanguineum* (*Mesospinidium sanguineum* Rehb. f.) and *S. strictum* (*Cochlioda stricta* Cogn.).—E. B. Payson.

537. SCHLECHTER, R. Noch einmal über *Epidendrum pentotis* Rehb. f. und *Epidendrum Beyrodtianum* Schltr. [Again concerning *Epidendrum pentotis* Rehb. f. and *Epidendrum Beyrodtianum* Schltr.] *Orchis* 13: 27-29. 1919.—The difference between these two similar species is reiterated, and drawings are presented to show the floral structure of *E. pentotis* Rehb. f.—E. B. Payson.

538. SCHLECHTER, R. *Oncidium* × *Burgeffianum* Schltr., eine interessante neue Kreuzung. [*Oncidium* × *Burgeffianum* Schltr., an interesting new hybrid.] *Orchis* 13: 29-30. 1919.—This hybrid has for its parents *Oncidium Marshallianum* Ldl. and *O. varicosum* Ldl.—*E. B. Payson*.

539. SCHLECHTER, R. *Vandanthe Tatzeri* Schltr. n. hybr. *Orchis* 13: 52-53. 1919.—A hybrid between *Vanda tricolor* Ldl. and *Euanthe Sanderiana* (Rehb. f.) Schltr. is described and illustrated.—*E. B. Payson*.

540. SCHLECHTER, R. Ein seltenes *Grammatophyllum*. [A rare *Grammatophyllum*.] *Orchis* 13: 54-55. 1919.—*Grammatophyllum papuanum* J. J. Smith is described and illustrated.—*E. B. Payson*.

541. SCHLECHTER, R. Die Gattung *Brassavola* R. Br. [The Genus *Brassavola* R. Br.] *Orchis* 13: 40-46, 58-62, 71-79. 1919.—The genus *Brassavola* is described, and an outline of its taxonomic history given with notes as to its geographical distribution. The sections *Eubrassavola*, *Prionoglossum*, *Conchoglossum* and *Cuneilabium* are proposed and under each section are listed their species with descriptions and synonymy. The following new species are described and new combinations made: *B. multiflora*, *B. nodosa* Lindl. var. *rhopalorrhachis* (*B. rhopalorrhachis* Rehb. f.), *B. scaposa*.—*E. B. Payson*.

542. SEDGWICK, L. J. The Cyperaceae of the Bombay Presidency, Part II. *Jour. Bombay Nat. Hist. Soc.* 26: 192-209. 1918.—A general systematic consideration with keys and descriptions of the genera and species, covering the genera *Courtoisia*, *Fimbristylis*, *Stenophyllum*, *Eleocharis*, *Scirpus*, *Eriophorum*, *Fuirena*, *Lipocarpa*, *Remirea*, *Rhyncospora*, *Hypolytrum*, *Scleria*, *Carex*. The first part was published in the preceding volume. No new names appear.—*E. D. Merrill*.

543. SEDGWICK, L. J. Reduction of *Euphorbia Rothiana* Sprengel, of the Indian floras. *Jour. Bombay Nat. Hist. Soc.* 26: 599-600. 1919.—The above Indian species, as hitherto interpreted, is referred in part to *Euphorbia lacta* Roth and in part to *E. oreophila* Miq.—*E. D. Merrill*.

544. SEDGWICK, L. J. On the species of *Zizyphus* in the Bombay Presidency. *Indian Forester* 45: 67-74. 1919.—Critical notes on seven species of *Zizyphus* occurring in India are given, with characteristics for field identification and distribution. Two forms of *Z. Oenoplia* Mill. are distinguished as forma *robusta* and forma *mollis*. *Z. Xylopyrus* Willd. var. *glaberrima* is tentatively proposed as a new variety. The suggestion is made that *Z. Xylopyrus* Willd. var. *micocarpa* may be a hybrid between *Z. Jujuba* and *Z. Xylopyrus*.—*E. N. Munns*.

545. SHREVE, FORREST. Monograph of the Cactaceae. [Rev. of: BRITTON, N. L., AND J. N. ROSE. The Cactaceae; descriptions and illustrations of plants of the cactus family. Vol. I. Carnegie Inst. [Washington] Publ. 248. 1919.] *Plant World* 22: 270-271. 1919.

546. SPRAGUE, T. A. *Dolichandrone* and *Markhamia*. *Bull. Misc. Inf. Kew* 1919: 302-314. 1919.—These bignoniaceous genera are contrasted, and under each genus are listed the species attributed to it. Detailed synonymy together with distributional and ecological notes is included for the various species. The following new combinations and new variety occur: *Dolichandrone atrovirens* (*Bignonia atrovirens* Heyne), *D. alba* (*Spathodea alba* Sim.), *Markhamia stipulata* Seem. var. *Kerrii*, *M. obtusifolia* (*Dolichandrone obtusifolia* Baker).—*E. Mead Wilcox*.

547. STAFF, O. *Gunnera manicata* and *brasiliensis*. *Bull. Misc. Inf. Kew* 1919: 376-378. 1919.—*Gunnera brasiliensis* Schindler is considered synonymous with *G. manicata* Lindl.—*E. Mead Wilcox*.

548. STAFF, OTTO. **Gramineae.** Flora of Tropical Africa 9⁴: 577-768. 1920.—This part continues the Paniceae as far as *Setaria*. The new genera, species and varieties in this part are as follows: *Paspalidium* (new genus) *geminatum* (*Panicum geminatum* Forsk.), *P. desertorum* (*Panicum desertorum* A. Rich.), *Urochloa bifalcigera* (*Panicum bifalcigerum* Stapf), *U. trichopus* (*Panicum trichopus* Hochst.), *U. pullulans* (*Panicum geminatum* Schweinf. not Forsk.), *U. pullulans* var. (?) *mosambicensis* (*Panicum mosambicense* Hack.), *U. brachyura* (*Panicum brachyurum* Hack.), *U. bolbodes* (*Helopus bolbodes* Steud.), *U. echinolaenoides*, *U. Helopus* (*Panicum Helopus* Trin.), *U. javanica* (*Panicum javanicum* Poir.), *U. rudis*, *U. setigera* (*Panicum setigerum* Retz.), *U. insculpta* (*Panicum insculptum* Steud.), *U. reptans* (*P. reptans* L.). *Echinochloa obtusiflora*, *E. Holubii* (*Panicum Holubii* Stapf.), *E. haploclada* (*Panicum haplocladum* Stapf), *E. jubata*, *Acroceras* (new genus) *oryzoides* (*Panicum oryzoides* Sw.), *A. macrum*, *A. amplexens*, *A. basicladum*, *Commelinidium* (new genus) *mayumbense* (*Panicum mayumbense* Franch.), *C. gabunense* (*Panicum gabunense* Hack.), *C. nervosum*, *Panicum flacciflorum*, *P. transvenulosum*, *P. spongiosum*, *P. ianthum*, *P. juncifolium*, *P. carinifolium*, *P. fulgens*, *P. nervatum* (*Isachne nervata* Franch.), *P. pubiglume*, *P. plagianthum*, *P. sublaetum* (*P. laetum* Stapf, not Kunth), *P. viciniiflorum*, *P. filicaule*, *P. Hanningtonii*, *P. phragmitoides*, *P. poaeoides*, *P. graniflorum*, *P. vagiflorum*, *P. poecilanthum*, *P. aphanoneurum*, *P. Rowlandii*, *P. genustlexum*, *P. paucinode*, *P. manicatum*, *P. sociale*, *P. novemnerve*, *P. arcurameum*, *P. subflabellatum*, *P. longijubatum*, *P. pectinellum*, *P. calvum*, *P. subobliquum*, *P. caudiglume* [not Hack. 1901], *P. microthyrsus*, *Entolasia* (new genus) *imbricata*, *E. olivacea*, *Hemigymnia* (new genus) *Arnottiana* (*Panicum Arnottianum* Nees), *Cyrtococcum* (new genus) *setigerum* (*Panicum setigerum* Beauv.), *Sacciolepis ciliocincta*, (*Panicum ciliocinctum* Pilg.), *S. singularis*, *S. nana*, *S. Chevalieri*, *S. brevifolia*, *S. huillensis* (*Panicum huillense* Rendle), *S. spiciformis* (*Panicum spiciforme* Hochst.), *S. interrupta* (*Panicum interruptum* Willd.), *S. cymbiandra*, *S. scirpioides*, *S. glaucescens*, *S. typhura* (*Panicum typhurum* Stapf), *S. incurva*, *S. transbarbata*, *S. auriculata*, *S. angusta* (*Panicum angustum* Trin.), *S. leptorrhachis*, *S. seslerioides* (*Panicum seslerioides* Rendle), *S. catumbensis* (*Panicum catumbense* Rendle), *S. albida*.—A. S. Hitchcock.

549. STUCKERT, T. **Contributions a la connaissance de la flore Argentine.** [Contributions to the knowledge of the flora of Argentina.] *Annuaire Conservatoire et Jard. Bot. Genève* 20: 428-464. 1919.—This consists of two parts. The first part is, *III. Énumération des Valérianiacées de l'Argentine* by STUCKERT and BRIQUET. The new names by BRIQUET are, *Valeriana sarscephylla* (Stuckert 7622a), *V. effusa* var. *genuina* (Stuckert 1037 and others), var. *Fiebrigii* (Bolivia, Fiebrig 2196), *V. approximata* (Tucuman, Stuckert 22022), *V. Gilliesii* (*Betckea Gilliesii* Hook. & Arn.), *V. glomerulosa* (Tucuman, Stuckert 7637), *V. Stuckertii* (Stuckert 2749 and others). The second part is, *IV. Catalogue des Oxalidacées de l'Argentine* by Stuckert. *Oxalis andicola* var. *Wallichiana* (*O. andicola* var. *calyce glabriusculo* Hook.) is a new variety. There is an annotated list with bibliography of 82 species of *Oxalis* and 3 species of *Hypseocharis*.—A. S. Hitchcock.

550. TATZER, A. *Vanda* × *Mariannae*, eine Kreuzung zwischen *Vanda tricolor* Lindl. und *Vanda Denisoniana* Rchb. f. [*Vanda* × *Mariannae*, a hybrid between *Vanda tricolor* Lindl. and *Vanda Denisoniana* Rchb. f.] *Orchis* 13: 50-51. 1919.—This hybrid is here described and illustrated.—E. B. Payson.

551. TURRILL, W. B. A revision of the genus *Mendoncia*. *Bull. Misc. Inf. Kew* 1919: 407-424. 1919.—This Central and South American genus is contrasted with related genera of the Acanthaceae by means of a dichotomous key. Twenty-five species are recognized, and under each is given an extended Latin diagnosis with citation of exsiccatae. A key to the species is also provided. The following species and varieties are described as new and the following new combinations made: *Mendoncia Spraguei*, *M. Tonduzii*, *M. coccinea* Vell. var. *sparatteria* (*M. Velloziana* Nees var. *sparatteria* Nees), *M. coccinea* var. *elliptica*, *M. gracilis*, *M. orbicularis*, *M. retusa*.—E. B. Payson.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

BURTON E. LIVINGSTON, *Editor*

552. ANONYMOUS. **Microscoptical optics.** [From a paper by A. E. CONRADY at a discussion on the microscope at the Royal Society on Jan. 14.] *Nature* 104: 548-550. 1920.

553. ANONYMOUS. **Peat fiber and the textile industry.** *Jour. Amer. Peat Soc.* 13: 350. 1920.

554. ANONYMOUS. [Rev. of: ALCOCK, W. BROUGHTON. **Canvas destroying fungi.** *Journ. Roy. Army Med. Corps* 32^o. Dec., 1919.] *Jour. Trop. Med. and Hygiene* 23: 41. 1920.—Researches in Malta and Italy show that the rotting of canvas is due to various fungi, but chiefly to species of *Macrosporium* and *Stemphylium*.—E. A. Bessey.

555. BARNARD, J. E. **Construction and use of microscopes.** *Nature* 104: 546-548. 1920.—Opening paper of a discussion on the microscope at the Royal Society on Jan. 14. Most microscopes are unstable. An object on the stage will not maintain its centration if the instrument is put into the horizontal. Imperfections in mechanical stages are general. Resolution, not magnification, is the primary function of an objective. No indication that numerical aperture will be further increased, but advances in illumination, especially by use of ultra-violet or perhaps still shorter radiations, may be hoped for. (See also Bot. Absts. 3, Entry 3033.)—O. A. Stevens.

556. BROWN, A. M. **Faults found in butter. Their definitions, causes and some suggested remedies for same.** *Agric. Gaz. New South Wales* 31: 490-494, 591-595. 1920.—Author discusses relation of certain bad characters found in butter to bacteria and fungi causing them.—L. R. Waldron.

557. DEELEN, H. **Peat fiber spinning.** *Jour. Amer. Peat Soc.* 13: 452. 1920.—German patent 316,511 covers the preparation from peat of fibers suitable for use with wool, cotton, or jute.—G. B. Rigg.

558. DUGGAR, B. M. **Some factors in research.** *Plant World* 22: 277-289. 1919.—A paper contributed to a symposium on the general topic "Our present duty as botanists," in Baltimore, 1918. Various factors are discussed, such as the establishment of research positions in connection with industrial enterprises, extension of opportunities to use special apparatus during vacation periods, conferences of groups of investigators interested in related problems, fostering post-doctorate and sabbatical-leave research, co-operation in publication and other activities, etc. It closes with a plea for better preparation, particularly in chemistry, for botanical research.—Charles A. Shull.

559. FISCHER, HERMAN. **Der Nährstoffgehalt unserer Gewässer und seine Ausnützung für die Urproduktion.** [The nutrient content of our waters and its use as an original productive factor.] *Naturwiss. Zeitschr. Forst- u. Landw.* 18: 66-83. 1920.—Agriculture has received too little study in the past when compared with its relative economic importance. The author discusses previous studies in this field, and dwells particularly on the relation of nitrogen, phosphoric acid, and potassium as found in fresh and salt waters to aquatic life, vegetative and piscatorial. Nitrogen and P_2O_5 are similar in salt and fresh water. In rivers, lakes, and other small natural bodies, the quantity of nutrients, especially of P_2O_5 is greatly influenced by the character of the soil surface, quantity of precipitation, etc. The humus coloring of water is a direct indication of the P_2O_5 content; and in general, all waters of limestone formations contain little, those over sandstone plentiful P_2O_5 . Although further experimentation is necessary, it is believed that increased P_2O_5 content in natural waters can be used in securing greater fish production; also, as the floor decreases in nitrogenous compounds, an increase in nitrogen is necessary to keep up production. The rela-

tion of potassium in natural waters varies inversely as that of P_2O_5 . Lime plays an important rôle indirectly in increasing the content of the other three nutrients, by replacing them in chemical reactions and releasing them for use as solutes. The article contains 2 tables giving analyses of waters, both basic and acidic, of inland lakes and tributaries.—*J. Roeser*.

560. MACINNES, L. T., AND H. H. RANDELL. Dairy produce factory premises and manufacturing processes. The application of scientific methods to their examination. *Agric. Gaz. New South Wales* 31: 563-566. 9 fig. 1920.—In this fourth and last installment under this title the authors make an agar plate examination of dairy produce, its containers, and the environment in a modern and finely constructed dairy plant. Results are in striking contrast to those found in other plants in which less attention had been paid to sanitary conditions. In a plant such as this, pasteurization results are not discounted by insanitation.—*L. R. Waldron*.

561. MACINNES, L. T., AND H. H. RANDELL. Dairy produce factory premises and manufacturing processes. The application of scientific methods to their examination. *Agric. Gaz. New South Wales* 31: 485-489. 7 fig. 1920.—This article gives in some detail the results of bacterial and fungal counts, qualitative and quantitative, of samples taken at different stages of manufacture of dairy products, of their containers, and of the general environment found in one factory. The conclusion to be drawn is that lack of scientific sanitary management and control is responsible for much financial loss and probable injury to health.—*L. R. Waldron*.

562. RADER, F. E. Report of the work at Matanuska station. *Rept. Alaska Agric. Exp. Sta.* 1917: 81-84. 1 pl. 1919.—Reports on preliminary work, including the clearing of the land.—*J. P. Anderson*.

563. SAUNDERS, CHARLES FRANCIS. Useful wild plants of the United States and Canada. 275 p., 16 pl., 74 fig. Robert M. McBride & Co.: New York, 1920.—A popular treatise dealing with native plants, especially those useful for food, but also considering those that are used for beverages, for soap substitutes, and for medicine, besides mentioning certain poisonous plants. The book is written in an attractive style, and the information it contains is selected with care.—*C. V. Piper*.

564. STOLL, FRANK. [Rev. of: PELLETT, FRANK C. American honey plants. 297 p., 155 fig. American Bee Journal, Hamilton, Ill. 1920.] *Torrey* 20: 104. 1920.—The book describes as valuable because of nectar or pollen production some 900 species, arranged alphabetically by common names, with Latin names accompanying the vernacular. The book is timely on account of the present sugar shortage.—*J. C. Nelson*.

565. WALLIS, T. E. Analytical microscopy. *Pharm. Jour.* 104: 247-249, 349-351, 395-397, 541-542, 578-579; *IDEM.* 105: 159-160, 283-284. 1920.

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INFORMATION CONCERNING BOTANICAL ABSTRACTS, *Continued*

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577. B., W. W. *Tropical control of Australian rainfall.* [Rev. of: QUAYLE, E. T., in bulletin No. 15 of the Commonwealth Bureau of Meteorology.] Nature 105: 152-153. 1920.

578. ANONYMOUS. *History of the Danish crop guarantee.* Seed World 7¹¹: 19-20. 1920.

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580. ANONYMOUS. *El algodón.* [Cotton.] Bol. Camara Agric. Nacion. Leon [Mexico] 7: 451-457. 1920.—A popular discussion of cotton culture in Mexico.—*John A. Stevenson.*

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582. ATKINSON, A., AND E. W. JOSEPH. *Sixth annual report of the Montana Grain Inspection Laboratory.* Montana Agric. Exp. Sta. Bull. 135. 22 p., 7 fig. 1920.—The bulletin gives the results of the seed testing and seed inspection work for the year ending June 30, 1919.—*H. E. Morris.*

583. ATKINSON, ALFRED, J. B. NELSON, C. N. ARNETT, W. E. JOSEPH, AND O. TRETSVEN. *Growing and feeding sunflowers in Montana.* Montana Agric. Exp. Sta. Bull. 131: 3-39. 4 fig. 1919.—The bulletin presents, in the first, part a brief discussion and history of the cultivated sunflower (*Helianthus annuus*) and gives the results of tests on yields and methods of growing and feeding sunflowers, as applied to Montana. The second part of the bulletin, pages 13-29, discusses the use of sunflowers as a silage crop.—*H. E. Morris.*

584. ATKINSON, E. H. *Weeds and their identification.* New Zealand Jour. Agric. 20: 299-301. Pl. I. 1920.—*Lantana camara* L. is described. It has been present in New Zealand for twenty-five years, but still seems to be confined to one rather small section. The fruit is reported to have made children sick, but it is not believed to be injurious to live stock.—*N. J. Giddings.*

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588. BARBER, C. A. **Agricultural notes on extending the milling season.** Internat. Sugar Jour. 22: 611-612. 1920.—The author describes the methods used for lengthening the sugar-cane milling season. The use of nitrogenous fertilizers, of ratoons, and of splitting up old stools into two or three parts and replanting the pieces are discussed. Much has been done by the suitable selection of early and late varieties.—*C. Rumbold*.

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595. BOVING, P. A. **Sunflowers for ensilage.** Agric. Jour. [British Columbia] 5: 196. 1920.

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597. BROWN, EDGAR. **What farmers should expect from seedsmen.** Seed World 8⁷: 26. 1920.—In this article it is pointed out that the seedsman holds a more directly responsible relation to agriculture than any other merchant, because the farmer is fundamentally dependent upon the seed merchant for his crop seed.—*M. T. Munn*.

598. BURGESS, J. L. **Farmers interest in good seed.** Seed World 7⁶: 27. 1920.

599. CARDON, P. V., W. O. WHITCOMB, AND W. F. DAY. **Seventh annual report of the Montana Grain Inspection Laboratory.** Montana Agric. Exp. Sta. Bull. 136. 32 p., 3 fig. 1920.—The bulletin discusses methods of collecting, shipping, and grading grain samples.

Inspection fees and Montana grades for wheat, oats, and barley are given, as well as a complete copy of the Montana State Grain Inspection Law. A preliminary statement of investigational work, detailed reports of seeds tested, and a financial statement of the laboratory are included.—*H. E. Morris.*

600. COCKAYNE, L. An economic investigation of the montane tussock-grassland of New Zealand. *New Zealand Jour. Agric.* 20: 337-345. 7 fig. 1920.—A comparison is made of the flora on a heavily-grazed and an adjoining lightly-grazed pasture at an elevation of about 2000 feet. *Coriaria sarmentosa* var. and *Celmisia spectabilis* are found particularly abundant in the lightly-grazed tract. *Coriaria sarmentosa* has been reported as poisonous to sheep, but in this instance they were apparently uninjured by it. The *Celmisia* is reported as unpalatable.—*N. J. Giddings.*

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607. DYMOND, J. R. Color characteristics of red clover seed. *Seed World* 74: 23. 1920.—In Canada in 1916 in samples of red clover seed, the purple-colored seeds were slightly more prevalent and in practically every case weighed more per thousand seeds than the yellow-colored seeds. Germination tests showed that the yellow seeds gave a higher percentage of germination and contained more hard seeds than the purple. The green or immature seeds gave the lowest percentage of germination, but contained a surprisingly high proportion of hard or impermeable seeds. The brown seeds are shown to be low in vitality and to contain the smallest percentage of hard seeds.—*M. T. Munn.*

608. ELORDUY, SAMUEL TORRES. Cultivo de la remolacha azucarera. [Sugar beet cultivation.] *Bol. Camara Agric. Nacion. Leon [Mexico]* 7: 493-495. 1920.

609. FINDLAY, HUGH. The handbook for practical farmers. 558 p., 258 fig. D. Appleton & Company: New York and London, 1920.—This book, edited by PROF. HUGH FINDLAY of Columbia University, consists in the main, of contributions from men who are actively engaged in the promotion of the subjects they discuss. Of the 558 pages, some 45 are devoted to soil management and drainage, 94 to a discussion of the chief field crops, 82 to the orchard, small fruits, and vegetables, 182 to animal husbandry, 42 to farm weeds and pests (not diseases), 96 to farm engineering, economics, and miscellaneous subjects; and the book concludes

with 20 pages giving weights, measures, and various useful rules. Under each topic the fundamental facts are given, but space prohibits considerable elaboration of the many subjects touched upon. The book contains much useful general information. The contributing authors and their subjects are: A. G. McCALL (Maryland Exp. Sta.), Soil Management, Manures and Fertilizers; R. G. WEGGANS (Coll. Agric., Cornell Univ.), Corn, Wheat, Oats, Barley, Rye, and Rotations; F. W. OLDENBURGH (Maryland State Coll. Agric.), Hay, Legumes, Forage, and Soiling Crops; J. R. FAIN (Univ. Georgia), The Culture of Cotton; W. W. GARNER (U. S. Dept. Agric.), Culture of Tobacco; A. G. SMITH (Virginia Polytech. Inst.), Culture of the Sweet Potato; C. W. WARD (Michigan Agric. Coll.), Fertilizers for the White Potato; WILLIAM C. SANCTUARY (New York State School Agric.), Poultry; JOHN McNUTT, (Massachusetts Agric. Coll.), Dairy Cattle; M. W. HARPER (Cornell Univ.), Horse; JAMES R. DICE (New York State School Agric.), Hogs; R. W. DUCK (Syracuse Univ.), Sheep; H. F. BALDWIN (Washington, D. C.), Milk Production; R. P. PRICHARD (New York State Coll. Forestry), Care of the Farm Wood Lot; C. CRAIG, AND A. LAMOTTE (DuPont Powder Works), The Use of Explosives on the Farm; EDGAR W. COOLEY (International Harvester Co.), The Care of Tools on the Farm; J. H. HEWETT (New York State School of Agric.), Some of the Common Diseases of Animals and Remedies; E. F. PHILLIPS (U. S. Dept. Agric.), Bee-Keeping on the Farm; W. T. L. TALIAFERRO (Maryland Agric. Coll.), Construction and Arrangement of Farm Buildings; A. P. YERKES (Maryland Agric. Coll.), Farm Engines and Their Care; E. O. FIPPIN (Cornell Univ.), Drainage on the Farm; JAMES B. MORMAN (Federal Farm Loan Banks), Benefits of the Federal Farm Loan System; H. T. SEOVIL (Univ. Illinois), Farm Records; and H. F. MILLER (Gould's Manufacturing Co.), Running Water for House and Outbuildings.—C. V. Piper.

610. GONZALEZ, J. Instrucciones para el cultivo y tratamiento del tabaco. [Cultivation and treatment of tobacco.] Informacion Agric. [Madrid] 10: 290-293. 1920.

611. GRABER, L. F. Wisconsin's Grimm alfalfa experience. Seed World 8³: 25-26. 1920.

612. GUTHRIE, F. B., AND G. W. NORRIS. Notes on wheats entered for the Royal Agricultural Society's show. Easter, 1920. Agric. Gaz. New South Wales 31: 627-635. 1920.—Weights per bushel, results of milling tests, and other notes are given on about 25 varieties of wheat entered; also details of the awards.—L. R. Waldron.

613. HALL, THOS. D. Glucose and starch from maize. South African Jour. Indust. 3: 597-605. 1920.

614. HENRICKSEN, H. C. The selection of seed corn in Porto Rico. Porto Rico Agric. Exp. Sta. Circ. 18: 1-22. 6 fig. 1920.—The importance of selecting seed corn is emphasized. Structure of a corn kernel and the variations in size, shape, and color of kernels of the principal varieties are discussed. Points to be considered in selecting desirable ears are given, together with two proposed score cards for use in Porto Rico. The ear-to-row method of maintaining selections is outlined. In conclusion a satisfactory method of preserving seed corn in Porto Rico is given.—John A. Stevenson.

615. HENSEL, M. W. Sweet sorghum variety demonstrations, 1919. North Carolina Agric. Ext. Ser. Circ. 102: 3-14. 1920.—Result of tests with 9 varieties of saccharine sorghums in 5 localities within North Carolina, to determine variety best suited for making syrup.—F. A. Wolf.

616. HOFFMAN, PAUL. Flachsbaum und Hausweberei, ein Mittel gegen Landflucht und Leutenot. [Flax culture and home weaving, a means against land desertion and popular want.] Mittheil. Deutsch. Landw. Ges. 35: 395-398. 1920.

617. INGRASON, P. A. La alfilaria. [Alfilaria.] Rev. Agric. [Mexico] 5: 228-233. 1919.—Description of the plants, seeding, cultivation, harvesting, and feeding value of *Erodium cicutarium* and related species, said to be of very great value as forage crops in arid regions.—John A. Stevenson.

618. JURITZ, CHAS. F. **The prickly pear (*Opuntia*). Possibilities of its utilization.** South African Jour. Indust. 3¹: 687-693. *Idem*. 3²: 803-814. 1920.—The possibility is discussed of utilizing the prickly pear as a useful fodder plant for stock and as an article of human diet. It is also considered as a source of potash fertilizer, of sugar and vinegar, of industrial alcohol, of oxalic acid, of oil, of a mucilaginous glaze, of sizing for textile factories, of fiber for paper making, of a dye or coloring matter, and as a basis for soap manufacture. From a practical standpoint not more than 7 or 8 of these seem to be deserving of serious attention.—*E. M. Doidge*.

619. KALT, BERTRAM. **Der Begriff "Originalsaatgut" und seine Anwendung bei der Züchtungsanerkennung.** [The conception of "original seed" and its application to recognized sorts.] Fühlings Landw. Zeitung 68: 460-471. 1919.—A discussion of the inspection and control of pure seed production with a view to insuring the genuineness, purity, and quality of the designated seed. An explanation of what the term "original seed" shall stand for, and the use and meaning of such terms as "improved" and "pedigreed" as applied to particular strains of seeds, and the organization and means through which such inspection and certification may be carried out.—*A. T. Wiancko*.

620. KEEBLE, FREDERICK. **Intensive cultivation.** Sci. Monthly 11: 445-451. 1920.—Extracts from an address at the Cardiff Meeting of the British A. A. S.—Skilled onion growers average 5 tons to the acre. A chrysanthemum grower who turned his facilities from these to onions averaged 17 tons. The average yield of potatoes is a little over 6 tons. The army gardeners of France produced 14 tons to the acre. Consequently it may be accepted as a fact that intensive cultivation would double crops.—*L. Pace*.

621. KELLY, H. J. **Agriculture at Nyngan.** Agric. Gaz. New South Wales 31: 685-687. 1920.—Experiments have shown that wheat as a grain crop at Nyngan, 250 miles northwest of Sydney, is unsafe, but that wheat for hay, and certain other fodder crops can be grown after fallow, if light seeding is practiced.—*L. R. Waldron*.

622. KILLER, J. **Die Knollenwachstumsintensität, einer bisher wenig beachteter Faktor in der Beurteilung der Kartoffelsorten.** [The rate of tuber development, a heretofore little noticed factor in judging the value of varieties of potatoes.] Fühlings Landw. Zeitung 68: 426-430. 1919.—Varieties of potatoes of similar time of maturity differ materially in the rate of growth at different periods. Some varieties make their most rapid growth early in the season, some in midseason, and some late in the season. These observations lead to important considerations regarding the utilization of plant-food in the soil, the influence of weather conditions at different times in the season, effect of disease attacks, and relation to marketing, and place the whole matter of potato culture in a different light than heretofore. With a knowledge of the peculiarities of varieties in these respects, it is possible to regulate plant-food supplies in the soil so as to be available when most needed, and to select varieties that in their growth intensity at different periods fit in with the different weather conditions usually prevailing at certain times in the particular locality.—*A. T. Wiancko*.

623. KIESSELBACH, T. A., AND RATCLIFF, J. A. **Freezing injury of seed corn.** Nebraska Agric. Exp. Sta. Res. Bull. 16. 96 p. 22 fig. 1920.—The authors discuss various theories advanced to explain the death of tissues by freezing.—Microscopic studies failed to disclose any rupturing of tissues or other cytological disturbances in corn embryos killed by freezing. It is believed that freezing of a corn embryo produces a physical or chemical change, aside from the withdrawing of water, in the protoplasmic and nuclear material of the cell, so that death ensues. The change in color of the embryo as a result of freezing would seem to indicate that a chemical change had taken place.—Control and field experiments indicate that death from freezing is directly related to the moisture content of the kernel and also to the duration of the exposure to cold. Seed corn maturing in a natural way becomes cold resistant progressively as its moisture content diminishes. Seed corn mortality increases progressively as the duration of the killing temperature is extended.—Extensive

tabular data are given, showing the correlation between degrees and duration of cold, ice formation inside the kernel, moisture content of the kernel, embryo discoloration, and loss of vitality.—Cultural practices relative to the selection and preservation of seed corn are discussed, and experimental data are presented in support of the conclusions.—*T. A. Kiesselbach.*

624. KOCH, PIETER. Cotton culture. Jour. Dept. Agric. Union of South Africa 1: 615-622. 1920.

325. LEE, S. C. Electrical treatment of seed. Agric. Gaz. Canada 7: 248-249. 1920.—Further investigations on electrically treated seed as compared with untreated seed on the trial grounds of the Manitoba Agricultural College, are briefly reported. A plot of Marquis wheat sown with electrically heated seed yielded $3\frac{1}{2}$ bushels more grain and 533 pounds more straw than the check. The plot showed a ranker growth and ripened more slowly. Rust affected both plots equally.—*O. W. Dynes.*

626. LEMMERMAN, D. Untersuchungen über verschiedene Düngungsfragen. [Investigations concerning various fertilizing problems.] Arbeiten der Deutsch. Landw. Ges. 297. 198 p. 1919.—The author reports various experiments, most of which were carried on at the Society's experimental fields in Dahlem, near Berlin. The following investigations are reported: The effect of fertilizing with nitrogen, phosphoric acid, potash, and lime, with and without stable manure on yields and on the fertilizer balance in the soil, 23 p.; Green manure studies, 25 p.; On the influence of organic substances on the nitrogen in fertilizers and in soils, 5 p.; Investigations with nitrogenous fertilizers, 48 p.; with phosphate, 17 p.; with potash, 8 p.; with lime, 9 p. There are also included meteorological tables and many pages of tabulated data.—*A. J. Pieters.*

627. LIEHR, O. Der Mohn, sein Anbau und seine Verwertung. [The culture and uses of poppy.] Fühlings Landw. Zeitung. 68: 191-198. 1919.—A popular discussion of the culture and uses of poppy for the production of seed and its products. The yield, composition, quality, and uses of poppy oil and the by-product, poppy cake, are shown and discussed in detail.—*A. T. Wiancko.*

628. LOFT, SELMAR. Determining dry matter in root crops. Seed World 7¹⁰: 21-22. 1920.—The author gives the testing methods used by Danish seed growers to secure the desired results. Dry-matter determinations are described in detail, giving the methods of drawing samples, washing, and sawing the roots, and the treatment of the final samples.—*M. T. Munn.*

629. MEEK, B. C., AND R. N. MAKIN. Farmers' experiment plots. Potato experiments, 1919-20. Central western district and south coast. Agric. Gaz. New South Wales 31: 621-625. 1920.—Yields are given of different varieties of potatoes with and without fertilizers. Fertilizers generally gave very favorable results.—*L. R. Waldron.*

630. MEEK, B. C., AND H. BARTLETT. Farmers' experiment plots. Maize experiments 1919-20. Central-western and north-west districts. Agric. Gaz. New South Wales 31: 703-706. 1920.—Conditions generally were adverse, and the results were not of particular value. Irrigated plats yielded as high as 68 bushels per acre.—*L. R. Waldron.*

631. MITSCHERLICH, E. A. Ein Beitrag zur Standweite verschiedener Kulturpflanzen. [A contribution regarding the spacing of various crops.] Fühlings Landw. Zeitung 68: 121-129. 1919.—Results of experiments with various thicknesses of planting potatoes, mustard, bushbeans, and hemp. The largest yields were secured from stands of plants per hectare as follows: potatoes, 33,333; mustard, 10,300,000; bushbeans, 800,000; hemp, 267,000. In the case of mustard, it is stated that broadcast seeding at a somewhat thicker rate might be expected to give still larger yields.—*A. T. Wiancko.*

632. MORGAN, G. W., AND A. E. SEAMANS. **Dry farming in the plains area of Montana.** Montana Agric. Exp. Sta. Circ 89:1-22. 1920.—The circular discusses the leading crops for the great plains—wheat, oats, barley, corn, and flax—mentioning uses and the varieties best adapted. Corn is a reliable source of fodder. Native grasses, brome grass, and alfalfa are recommended for permanent pastures, while alfalfa, brome grass, sweet clover, and small grains all make good hay; and in some sections sorghums, millets, and Sudan grass have been successfully grown.—*H. E. Morris.*

633. MUNDY, H. G. **The cultivation of rice.** Rhodesia Agric. Jour. 17:321-324. 2 fig. 1920.

634. MUNDY, H. G. **The cultivation of rice in southern Rhodesia.** Rhodesia Agric. Jour. 17:243-246. 1920.

635. MUNN, M. T. **The New York seed law and seed testing.** New York Agric. Exp. Sta. [Geneva] Bull. 476. 28 p. 1920. Chiefly a discussion of the provisions of a recently-enacted seed law, which requires that agricultural seeds offered for sale in the state of New York shall be labeled, so as to show their purity and viability.—*F. C. Stewart.*

636. NEWTON, W. **Soil treatment for the Nechako Valley.** Agric. Jour. [British Columbia] 5:202-203. 1920.

637. NEWTON, W. **The quality in potatoes.** Agric. Jour. [British Columbia] 5:152. 1920.

638. OSWALD, H. **Untersuchungen über die Einwirkung des Grundwasserstands auf die Bewurzelung von Wiesenpflanzen auf Moorböden.** [Investigations concerning the effect of ground water level upon the root development of meadow plants on moor soils.] Fühlings Landw. Zeitung. 68:321-340, 370-386. 1919.—The studies were conducted on two types of moor soil, lowland moor and highland moor. The ground water level was maintained at different heights in different pots, and a mixture of clover and grass seeds was sown. Details are given of the yields and root development of the clovers and various grasses in the pots. The root development was determined at the end of the 5th year, when it was found that in low moor soil practically half the roots were those of sword grass; this grass together with meadow fescue and orchard grass made up 81 to 98 per cent of the total root content in the various pots. The great bulk of grass roots was found in the upper 10 cm. of soil. Sword grass, orchard grass, and meadow fescue were found to have the deepest root systems; these penetrated to the water table in the deepest soil. For particulars of the proportion of roots of the different grasses and the depth to which they penetrated with water tables at varying levels, the reader is referred to the original. The article is accompanied by a long bibliography.—*A. T. Wiancko.*

639. PETERSEN, FEDERICO. **Los trigos seleccionadas de la hacienda Amalucan.** [Selected wheats at hacienda Amalucan.] Rev. Agric. [Mexico] 5:112-118. 4 fig. 1919.—The results of tests of 3 selected wheat varieties, Flor, Maravilla I, and Maravilla II in comparison with unselected varieties are given. The tests were carried out on 36 farms, the selected varieties giving greatly increased yields as well as proving more resistant to drouth and rust (*Puccinia* spp.). Tests were also made on different soil types and with different cultivation methods.—*John A. Stevenson.*

640. PITT, J. M. **Broom millet on the Manning.** Agric. Gaz. New South Wales 31:637-644. 6 fig. 1920.—Cultural and other notes are given for this crop, *Holcus Sorghum* L.—*L. R. Waldron.*

641. POLE EVANS, I. B. **South African fiber plants. Ambari or Deccan Hemp: Hibiscus cannabinus, L.** Jour. Dept. Agric. Union of South Africa 1:570-580. 6 p^l. 1920.

642. POPP, M., AND R. FLOSS. **Das Susspressfutter als Futter für Milchvieh.** [Sweet silage as feed for milk cows.] *Mittheil. Deutsch. Landw. Ges.* 35:391-394. 1920.—The authors describe an experiment with a form of ensilage, the making of which is said to have been developed in Switzerland. The process is not described in detail, but the reader is referred to previous papers. In the experiments reported in this paper rowen was used from a grass meadow. One portion of the rowen was made into hay, and the other put into a silo under pressure. The feeding experiment was carried on for varying periods, using the hay and the sweet silage from the same rowen grass. Analyses showed that the fat content and the crude protein content were the same for both hay and silage. The pure protein and the digestible protein were, however, greater in the hay; while the amides increased in the silage.—The cows gave more milk from the silage than from the hay; and even after the supply of silage was exhausted, the cows that had been fed on it appeared to retain the increased milk flow. The making of sweet silage is highly recommended by the authors.—*A. J. Pieters.*

643. PRIDHAM, J. T. **Breeding cereals at the experiment farms.** *Agric. Gaz. New South Wales* 31:697-698. 1920.—See *Bot. Absts.* 7, Entry 926.

644. RENSON, CARLOS. **Cultivo de la papa.** [Potato cultivation.] *Bol. Camara Agric. Nacion. Leon [Mexico]* 7:467-471. 1920.

645. RENSON, CARLOS. **Cultivo de la papa.** [Potato cultivation.] *Jalisco Rural [Mexico]* 2:147-153. 1920.

646. REVENTÓS, JAUME. **La soja.** [The soy bean.] *Rev. Inst. Agric. Catalan de San Isidro.* 69:65-68, 81-85. 1920.—The author gives analyses of the beans, considers their food value, uses of the oil and commercial products derived from them.—*John A. Stevenson.*

647. ROBISON, W. L. **Corn by-products for swine.** *Monthly Bull. Ohio Agric. Exp. Sta.* 5^o:247. 1920.

648. RUMSEY, H. J. **Seed growing in Australia.** *Seed World* 8³:27-28. 1920.

649. RUSSELL, E. J. **The nations food.** [Rev. of: REW, R. H. *Food supplies in peace and war.* vii + 183 p. Longmans, Green and Co.: London, 1920.] *Nature* 105:320-321. 1920.

650. RUSSELL, E. J. **British crop production.** *Nature* 105:176-178; 206-208. 1920.—A discussion of means of increasing production. Data of yields, cost of production, fertilizers, etc.—*O. A. Stevens.*

651. RUSSELL, E. J. **Wheat and wheat growing.** [Rev. of: BULLER, A. H. R. *Essays on wheat.* xv + 339 p. The Macmillan Co.: New York and London, 1919.] *Nature* 105:224-225. 1920.—Reviewer finds it a very interesting history of wheat in Canada.—*O. A. Stevens.*

652. SANCHEZ, A. **Algunos datos sobre el cultivo del maguey.** [Notes on the cultivation of maguey.] *Rev. Agric. [Mexico]* 5:227-228. 1919.—*Agave* sp.

653. SANCHEZ, N. **El cultivo de la papa.** [Potato cultivation.] *Rev. Agric. [Mexico]* 5:267-269. 1919.

654. SCOTT, J. M. **Forage crops in the South.** *Seed World* 8¹:40. 1920.

655. SHEEHAN, B. F. **Dodder in Idaho.** *Seed World* 8⁵:26-28. 1920.—In this article the author discusses dodder as a noxious weed pest, threatening the small seed industry of Idaho. The methods of dissemination of the seed and the plant, its appearance, and methods of eradication in the field, are given, together with some notes upon the principal kinds of dodder.—*M. T. Munn.*

656. SHEEHAN, B. F. **Responsibility for low-quality seeds.** Seed World 77: 23-24. 1920.—The writer gives as reasons for the marketing of inferior seeds, mentioning as the most important, the farmers' practice of selling one another adulterated seeds, of saving screenings for seed, and of purchasing second or third-grade seed for planting. It is urged that the farmer selling seed for seeding purposes should be required to comply with the same regulations as the dealer. It is suggested that the logical method of handling seeds in interstate commerce is through the medium of national grades, which would be flexible, yet place a premium upon high grade seeds.—*M. T. Munn.*
657. SIFTON, H. B. **Longevity of cereal, clover, and timothy seed.** Seed World 74: 26-28. 1920.
658. STEWART, F. C. **Experiments on the spacing of potato plants.** New York Agric. Exp. Sta. [Geneva] Bull. 474: 1-32. 1920.—These experiments were conducted at Geneva, New York, during 5 seasons and were devoted chiefly to a comparison of 6- by 36-inch planting with 15- by 36-inch planting. Two varieties of *Solanum tuberosum* belonging to the Rural group were used. In different seasons, the thick planting produced from 55.4 to 79.2 per cent more tubers than the thin planting, but as the tubers were of smaller average size the difference in total weight of crop was much less; viz., 14.4 to 36.9 per cent. The average net yield (total yield minus "seed") of tubers weighing over one ounce was 34.7 bushels per acre. More than half of this difference (18.7 bushels) consisted of tubers over two ounces in weight.—*F. C. Stewart.*
659. STONE, A. L. **Seed legislation and the farmer.** Seed World 71^o: 23. 1920.—The conclusion is reached that seed laws should not favor the farmer, but should be designed only to protect him from technical phases of seed trade and commerce. The practice of exempting farmers under the seed laws is not considered desirable.—*M. T. Munn.*
660. SUDENDORF, TH., AND G. GAHRTZ. **Beitrag zur Ermittlung des Blausäuergehaltes in Rangoonbohnen.** [Cyanide content of lima beans.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 350-353. 1920.—The cyanide content depends on the source of the beans as well as on the method of preparation.—*H. G. Barbour.*
661. SWINGLE, D. B., AND GRACE B. NUTTING. **Legume inoculation.** Montana Agric. Exp. Sta. Circ. 88. 8 p. 1919.—The circular discusses briefly legume inoculation and its advantages. The different methods in use are described.—*H. E. Morris.*
662. THORNE, C. E. **The manufacture of sorghum syrup.** Monthly Bull. Ohio Agric. Exp. Sta. 57: 199. 2 pl. July, 1920.—The article comprises a brief discussion of the essential points in handling cane and producing high grade syrup from the juice.—*R. C. Thomas.*
663. THORNE, CHAS. E. **The maintenance of soil fertility in Hamilton county, Ohio.** Monthly Bull. Ohio Agric. Exp. Sta. 51^o: 170. 1920.—This involves a report of the benefits from fertilizers and limestone in a corn, soybean, wheat, clover rotation. A detailed comparison of certain varieties is given.—*R. C. Thomas.*
664. THORNE, CHAS. E. **A crop rotation for a hog farm.** Monthly Bull. Ohio Agric. Exp. Sta. 55: 131. 1920.—Corn, being deficient both in protein and lime, is inadequate as a muscle and protein builder. Defective features in a corn, wheat, clover rotation are pointed out. The value of the soy bean as a feed crop, and for the production of bone, protein, and pork is discussed. Consideration is given to the relative manurial value of straw and stover.—*R. C. Thomas.*
665. TICE, C. **Certified potato-seed production.** Agric. Jour. [British Columbia] 5: 197. 1920.
666. TICE, C. **Pitt Meadows demonstration plot.** Agric. Jour. [British Columbia] 5: 110, 112. 1920.

667. URE, RUBY, AND BEATRICE, LARSON. Single vs. double blotters in germination testing. *Seed World*. 7⁵: 17. 1920.

668. UYEDA, Y. The proximate composition of Korean hemp and ramie. *Jour. Indust. Eng. Chem.* 12: 573-576. 1920.—The proximate composition of Korean hemp and ramie are given as determined by the modifications of the analytical method proposed by DORE.—*Henry Schmitz*.

669. VOGEL, PROF. DR. Die Impfrage der Nichtleguminosen. [Inoculation of non-legumes.] *Mittheil. Deutsch. Landw. Ges.* 35: 529-532. 1920.—The author reviews the experiments that have been made with such substances as "U" cultures, "Nitrogen kompost," "Biostickstoff," "Azogenin," "Agranit," and others, and finds them without value. However, a preparation known as "Guanol," a bacterized turf, has given good results. The same quantity of nitrogen in Guanol has produced larger yields than when used as nitrate of soda. The author states that Guanol acts through its relatively high nitrogen and potash content and its content of water soluble organic substances which stimulate soil bacteria to increased activity.—*A. J. Pieters*.

670. WALDRON, C. H. Notes on the germination of Kentucky bluegrass. *Seed World* 7⁶: 22. 1920.

671. WARBURG, OTTO. Ueber die Fasern liefernden Boehmeria-Arten. [Species of *Boehmeria* producing fiber.] *Notizbl. Bot. Gart. Berlin* 7⁶⁸: 1-7. 1920.—The economic species are *Boehmeria niva* (L.) Hook. Arn. and *B. tenacissima* (Roxb.) Gaud.—*H. A. Gleason*.

672. WENHOLZ, H. Sunflowers as silage. *Agric. Gaz. New South Wales* 31: 721-723. 1920.—This article summarizes results secured in United States and Canada.—*L. R. Waldron*.

673. WENHOLZ, H. Cuzco maize. *Agric. Gaz. New South Wales* 31: 701-702. 1920.—This variety was not found adapted to New South Wales. The amount of fodder produced was not up to the standard, and it produced ripe seed with difficulty. Silk did not develop until 6 weeks after tassels appeared.—*L. R. Waldron*.

674. WHIPPLE, O. B. Thinning as a possible substitute for seed pieces of uniform size in potato tests. *Proc. Amer. Soc. Hort. Sci.* 16: 179-181. (1919)—1920.—By thinning potatoes to a single stem, size and uniformity of size were improved. The author suggests "that variations in yields resulting from planting large and small seed pieces may be purely a matter of stand." The increased yield resulting from planting larger seed pieces may be largely due to increased number of plants per hill. Field counts showed that plots of Russet Burbank potatoes planted with 1.3-ounce seed-pieces average 2.27, 1.04-ounce seed-pieces averaged 2.22, and 1.3-ounce seed-pieces averaged 1.47 plants per hill.—*H. A. Jones*.

675. WHIPPLE, O. B. Correlation between depths of eyes and degeneration among potatoes. *Proc. Amer. Soc. Hort. Sci.* 16: 181-183. (1919)—1920.—Results of field experiments show that there is a correlation between shallowness of potato eyes and degeneracy. The writer is convinced that there is no surer way of bringing about deterioration within these varieties inclined to degeneration than by continual selection of shallow-eyed types. The Howard Elliot, a deep-eyed, high-yielding variety was selected three years for shallowness of eyes. At end of this time 90 per cent of the plants showed degenerate tendencies.—*H. A. Jones*.

676. WILLAMAN, J. J., R. M. WEST, AND C. P. BULL. Sorghum and sorghum sirup manufacture. *Minnesota Agric. Exp. Sta. Bull.* 187: 1-55. 17 fig. 1919.—The growing of sorghum, preparation for the mill and the manufacture of the sirup are discussed.—*A. C. Arny*.

677. WILLIAMS, C. B. Report of the Division of Agronomy, North Carolina Agricultural Exp. Sta. *North Carolina Agric. Exp. Sta. Ann. Rept.* 42: 21-39. 1920.—Brief summary of investigational work on soil fertility and fertilizer tests, on crop rotation and on crop improvement by breeding and selection.—*F. A. Wolf*.

678. WILLIAMS, C. G. **Wheat: varietal and cultural work.** Monthly Bull. Ohio Agric. Exp. Sta. 57: 195. 1920.—Wheat tests are being conducted at fourteen different points in Ohio. Among the many varieties tested, the Gladden, Trumbull, Ohio 9920, and Portage, rank high.—*R. C. Thomas.*

679. WILLIAMS, C. B., AND R. Y. WINTERS. **Crimson clover for North Carolina.** North Carolina Agric. Ext. Serv. Ext. Circ. 98. 7 p. 1919.—A popular agronomic account dealing with varieties, preparation of soil, seeding, inoculation, and harvesting for hay or seed.—*F. A. Wolf.*

680. WILLIAMS, C. B., AND R. Y. WINTERS. **Vetch for North Carolina.** North Carolina Agric. Ext. Serv. Ext. Circ. 96. 8 p. 1919.—Popular account indicating varieties adapted to the state, method for preparation of seed bed, seeding, inoculation, and value for hay or pasture.—*F. A. Wolf.*

681. WINTERS, R. Y., S. W. HILL, AND P. H. KIME. **Community cotton improvement in North Carolina.** North Carolina Agric. Exp. Ser. Ext. Circ. 108. 30 p. 10 fig. 1920.—An account of tests with cotton conducted to determine the variety best adapted to each of the various localities, together with results of seed selection for the improvement of these varieties.—*F. A. Wolf.*

682. WINTERS, R. Y., G. M. GARREN, AND BIXTON WHITE. **Improved seed wheat for North Carolina.** North Carolina Ext. Agric. Serv. Ext. Circ. 106. 14 p. 1920.—Comparative tests made near Asheville and Statesville, North Carolina, over a period of three years have shown that home-grown seed is superior to northern-grown seed. Data on the value of selection for the improvement of wheat are also included.—*F. A. Wolf.*

683. WITTMACK, L. **Der wahre Wert des Schilfrohrs als Wirtschaftspflanze.** [The true value of *Phragmites communis* as an economic plant.] Mittheil. Deutsch. Landw. Ges. 35: 532-533. 1920.—The young leaves dried and cut into small pieces are readily eaten by cattle. The claim has been made that the root-stocks contain 30 per cent cane sugar, but the author shows, by quoting various analyses, that this figure is much too high, even when taken as the sugar content of the dry substances.—*A. J. Pieters.*

684. ZAVITZ, C. A. **Systematic Experiments.** Agric. Gaz. Canada 7: 244-246. 1920.—A brief summary is given of the 1919 results throughout Ontario in testing all classes of field crops. Comparative values of leading varieties are calculated in percentages, together with summaries of yields of straw and grain. Data on the percentage of leaf roll and mosaic in potatoes were taken. Higher yields and lower susceptibility to diseases were found in the northern-grown stock.—*O. W. Dynes.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

685. ALGAN, H. **Bibliographie.** [Rev. of: HUFFEL, G. *Économie forestière.* [Forest economy.] Tome premier, deuxième volume, deuxième édition. 461 p. 1920.] Bull. Trimest Soc. Forest. Franche Comté et Belfort 13: 196-202. 1920.—See Bot. Absts. 7, Entry 741.

686. ANDREWS, A. LEROY. **Ingebrigt Hagen.** Bryologist 23: 79-80. 1920.—The author condenses a biographic notice by DR. WILLE in Kgl. Norsk Vidensk. Sels. Skr., 1917, and adds a number of recollections about DR. HAGEN's views, personality, and methods of work.—*E. B. Chamberlain.*

687. ANONYMOUS. **Geo. Stephen West, M.A., D.Sc., F.L.S.** Jour. Quekett Microsc. Club 14: 104-105. 1919.—Obituary Notice.—*Leva B. Walker.*

688. ANONYMOUS. *Courses on the history of science*. *Nature* 105: 279. 1920.—These are just beginning to be introduced in British universities.—*O. A. Stevens*.

689. ANONYMOUS. [Note of death of A. P. Candolle, with brief statement of his work.] *Nature* 105: 365. 1920.—See also Bot. Absts. 6, Entry 1437.

690. ANONYMOUS. Prof. C. A. Timiriazeff. *Nature* 105: 430. 1920.—Announces the death of TIMIRIAZEFF, "the only Russian botanist who was at all a familiar figure in England." Author of several books on plant life. Noted for demonstration of effects of different rays of the visible spectrum on photosynthetic activity of the green leaf.—*O. A. Stevens*.

691. [B., V. H.] Wilhelm Pfeffer. *Nature* 105: 302. 1920.—Brief note of life and work.—*O. A. Stevens*.

692. ANONYMOUS. Tribute to the memory of James Wilson. *Sci. Monthly* 11: 478-479. 1920.—Records a tribute to the memory of JAMES WILSON, former U. S. secretary of Agriculture.—*L. Pace*.

693. ANONYMOUS. Scientific and systematic pomology. [Rev. of: *The Journal of Pomology*, Vol. 1, No. 1 and 2. Geo. Bunyard & Co.: Maidstone, 1920.] *Nature* 105: 629-630. 1920.

694. BRITTEN, JAMES. *Lehmann's Pugilli*. *Jour. Botany* 58: 198-200. 1920.—This is an account of the *Pugillus Plantarum* by JOHANN GEORG CHRISTIAN LEHMANN, 1828-1857. Ten "Pugilli" are noted: the first (1828) contained 29 species; the second (1830) included some of DOUGLAS's Californian plants; the third to sixth had no date on the title page, but were stated to have been reprinted from *The Indies* for 1831, 1832, 1833, and 1834; the fourth and fifth have prefaces dated 1831 and 1833; the seventh and eighth are dated 1838 and 1844; the ninth and tenth were issued independently in 1851 and 1857. The third is entirely devoted to Hepaticae. The first portion of No. 6 contains *De Plantis Cycadeis praesertim Africae Australis*. No. 7 contains, besides Hepaticae, a history of the Hamburg Botanical Garden. The second part of the eighth is occupied by descriptions of PREISS's New Holland plants. No. 9 is entirely occupied by *Potentilla*. The tenth contains only hepatics.—*K. M. Wiegand*.

695. BRITTEN, JAMES. John Gilbert Baker (1834-1920). *Jour. Botany* 58: 233-238. 1920.—BAKER was born in Yorkshire, Jan. 13, 1834, and educated in the Friends' schools at Ackworth and York. His botanical work began while at the former school. He is pictured as a very kindly man, prone to aid the beginner, a man of keen literary sense, much interested in poetry, and a genial friend of students and workers in the Royal Gardens. His portrait appeared in *Jour. Botany* 1893, p. 243; *Ibid.*, 1901, frontispiece; *Ibid.*, 1907, p. 67.—*K. M. Wiegand*.

696. CHASE, VIRGINIUS H. Francis Eugene M'Donald. *Rhodora* 22: 145-146. 1920.—A short biographical sketch of the late FRANCIS EUGENE McDONALD, born Feb. 23, 1860, died Jan. 30, 1920. An amateur botanist and collector. His home was in Peoria, Illinois, in which region most of his collecting was done.—*James P. Poole*.

697. DUCLAUX, EMILE. *Pasteur: the history of a mind*. English translation by ERWIN F. SMITH, and FLORENCE HEDGES. 23 x 15 cm., xxii + 363 p., 22 fig., 16 pl. W. B. Saunders Co.: Philadelphia, 1920.—"This book is more than a critique of PASTEUR. It is a contribution to the biological history of a swiftly changing time, a very striking period in the development of science."—E. F. S.—In an introduction of 32 pages, SMITH presents a biographical sketch of DUCLAUX. The translators have supplied notations to the text throughout. In addition, an annotated list of persons mentioned in the text occupies 40 pages.—Of the plates, 2 are of DUCLAUX and 14 of PASTEUR.—*D. Reddick*.

698. GUNTHER, R. T. Tradescant's first garden catalogue, 1634. *Jour. Botany* 58: 248. 1920.—The writer has in his possession one of the few copies if not the only copy in existence

of the first catalogue of TRADESCANT's plants. The generally-quoted edition appeared in 1656. Seven hundred and fifty species and varieties are listed in this first edition. A catalogue of fruits occupies the last five pages.—K. M. Wiegand.

699. GUNTHER, R. T. Walter Stonehouse (1597-1655). Jour. Botany 58: 170-173. 1920.—MR. STONEHOUSE, the botanist, is shown to be identical with REV. WALTER STONEHOUSE, of Magdalen College, Oxford,—a fact not before generally known. The identity was discovered through an anonymous *Catalogus Plantarum Horti mei Darfeldiae Quibus*, etc., and passages in JOHN TRADESCANT'S *Musaeum Tradescantianum*. STONEHOUSE was a Londoner, born in 1597, and later a scholar of Wadham College, Oxford, taking his B.A. degree in 1616-17, and becoming a Fellow of Magdalen College in 1617. In 1629 he became a Bachelor of Divinity, and resigned from the college, becoming rector of DARFIELD. An account is given of his association with THOMAS JOHNSON and others, and of a trip with these gentlemen to the mountains of North Wales. About 1648 he was forcibly ejected from his parish by the Parliamentary Commissioners. STONEHOUSE was personally acquainted with PARKINSON.—K. M. Wiegand.

700. HUTT, W. M. Past history of the American pomological society. Proc. Amer. Pomol. Soc. 1917: 1-10. 1918.—A general paper. Attention is drawn to the fact that members of the society tested the different varieties of fruits in the United States long before the organization of agricultural colleges and experiment stations. Rules of nomenclature, which are still used as standard, were passed.—A statement regarding the financial standing of the Society is included.—E. C. Auchter.

701. LINTON, EDWARD FRANCIS. William Moyle Rogers (1835-1920). Jour. Botany 58: 161-164. *Portrait*. 1920.—ROGERS was born at Helston, Cornwall, July 12, 1835, and was educated at Helston Grammar School, where he was later an assistant master. After a short residence in Dublin he went to South Africa as vice-principal of a college there. At about this time he was ordained to priesthood. In 1862 he returned home, and, after occupying a series of clerical positions, became vicar of Bridgerule, Devon, in 1882, from which position he retired in 1885. A detailed account is given of ROGERS's very numerous contributions on botanical subjects, especially of his papers on *Rubus*, on which genus he became a specialist. These studies resulted in a *Handbook of the British Rubi* in 1900. During his later years he often assisted the clergy about Bornemouth, his home, until his death on May 26, 1920.—K. M. Wiegand.

702. MATTIROLO, ORESTE. Pietro Andrea Saccardo—Treviso 23 Aprile 1845—Padova 12 Febraio 1920. [Commemoration of Pietro Andrea Saccardo, b. April 23, 1845 at Treviso, d. February 12, 1920, at Padua.] Atti R. Accad. Sci. Torino 55: 468-473. 1919-1920.—His chief works were: *Sylloge fungorum omnium hucusque cognitorum*. 22 volumes; *Prevedibili funghi futuri secondo la legge di analogia*, 1896; *Botanica in Italia*; *Cronologia della Flora italiana*; *Flora Tarvisina Renovata*; *Enumerazione critica delle piante vascolari finora note nella provincia Treviso*.—Harriet M. Libby.

703. MATTIROLO, ORESTE. Commemorazione di Saverio Belli. [Memorial to Saverio Belli.] Atti R. Accad. Sci. Torino 55: 8-30. 1919-1920.—SAVERIO BELLi was director of the Botanical Gardens at Turin, professor of botany at the University of Cagliari, member of the Royal Academy of Agriculture, and of many scientific societies. His chief fields of research were in taxonomy, anatomy, and physiology and are concerned mainly with the genera, *Trifolium* and *Hieracium*. His researches in systematic botany established the reality of the species of a genus or a family as the descendants of a common genealogical tree, with phylogenetic ramifications both in time and space. In anatomy, he showed that neither endoderm nor pericycle exist in *Trifolium* and many other plants, and that therefore the theory of the stele can not have general application.—A complete bibliography of his works is given covering the studies on *Trifolium* and *Hieracium*, taxonomy of phanerogams and cryptogams, and miscellaneous works.—Harriet M. Libby.

704. MAXWELL, HERBERT. Sir Edmund Giles Loder, Bart. *Nature* 105: 301-302. 1920.—Brief account of his life and work. In botany he was especially interested in hybridizing rhododendrons, producing *R. Loderi*, a hybrid of *R. Griffithianum* and *R. Fortunei*, generally admitted to be the best hardy hybrid yet produced in the genus.—O. A. Stevens.

705. MERRILL, ELMER D. Dates of publication. *Jour. Botany* 58: 200. 1920.—This is a criticism of the practice among certain publishers of omitting the date of publication from the title pages. The specific case in question is F. MANSON BAILEY's *Comprehension Catalogue of Queensland Plants*, the date of which the author believes was March, 1913.—K. M. Wiegand.

706. MONTEMARTINI, LUIGI. Pier Andrea Saccardo. *Patol. Veg.* 10: 49-50. 1920.—On February 11, 1920, P. A. SACCARDO died at Padova, at the age of 74 years, after having been professor of botany there for 41 years.—F. M. Blodgett.

707. MONTEMARTINI, LUIGI. Giovanni Briosi. *Rev. Patol. Veg.* 10: 33-35. 1920.—PROFESSOR GIOVANNI BRIOSI was born in Ferrara, April 9, 1846, and died July 20, 1919. He was first director of the experiment station of agricultural chemistry at Palermo and Rome; in 1883 he became professor of botany in the Royal University of Pavia and also directed the Italian cryptogamic laboratory.—A list of his publications is given.—F. M. Blodgett.

708. SINTUREL, E. La forêt de Fontainebleau de 1789 à 1794. [The forest of Fontainebleau from 1789 to 1794.] *Rev. Eaux et Forêts* 58: 218-226, 255-263, 281-288. 1920.—During the first years of the French Revolution the forest of Fontainebleau, like other forests throughout France, suffered severely from depredations by the neighboring inhabitants. Attempts by both local and national authorities, including the king, to check these availed little except for a short period of comparative calm during the first half of 1790. Non-payment of salaries of forest officers resulted in a slackening of their efforts to protect the forests; and on August 15, 1792, the Legislative Assembly, in an attempt to revive their interest, passed an act providing for the payment of back salaries. It was not, however, until the establishment of the first republic that really effective steps to protect the forest were taken. In the fall of 1793 the National Convention, recognizing the forest as a public asset of great value, energetically set about its preservation. Armed forces were introduced to supplement the efforts of the regular forest officers; a proposal to increase the food supply by allowing goat grazing was rejected; trespassers were apprehended and punished; and all but comparatively minor depredations were successfully prevented.—S. T. Dana.

709. SMITH, ANNIE MORRILL. Mary Farnham Miller. *Bryologist* 23: 80. 1920.—An appreciation of Miss MILLER's work on behalf of the Sullivant Moss Society.—E. B. Chamberlain.

710. SMITH, E. F. [Émile Duclaux, 1840-1904.] In DUCLAUX, EMILÉ. *Pasteur: the history of a mind*. English translation by ERWIN F. SMITH AND FLORENCE HEDGES. W. B. Saunders Co.: Philadelphia, 1920. Most of the 30 pages of introduction to the book is devoted to a biographical sketch of DUCLAUX with a translation of a part of the eulogy on DUCLAUX said to have been written by ROUX and published in *Annales de l'Institut Pasteur*, May, 1904.—D. Reddick.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ALFRED GUNDERSEN, *Assistant Editor*

711. ANONYMOUS. A university course in botany. [Rev. of: CHURCH, A. H. *Botanical Memoirs*. No. 4. *Elementary notes on structural botany*. 27 p. No. 5. *Elementary notes on the reproduction of angiosperms*. 24 p. Oxford University Press: London, 1919.] *Nature* 105: 162. 1920.

712. ANONYMOUS. A college of tropical agriculture. [Rev. of: ANONYMOUS. *West Indies; report of the tropical agricultural college committee*. H. M. stationery office, 1920.] *Nature* 105: 153-154. 1920. Outline of organization of a college of agriculture recommended to be established at Trinidad.—O. A. *Stevens*.

713. BARTLETT, A. W. Note on an improved method for demonstrating the absorption of oxygen in respiration. *New Phytol.* 19: 151-152. 1920.

714. BRIERLEY, W. B. [Rev. of: ELLIS, G. S. M. *Applied botany*. VIII + 248 p. Hodder and Stoughton: London, 1919.] *Nature* 105: 164. 1920.—Reviewer finds many errors in this exposition of "the secrets of plant life."—O. A. *Stevens*.

715. CLUTE, WILLARD N. Plant names and their meanings, III. *Rosaceae*. (See Bot. Absts. 7, Entry 716.) *Amer. Botanist* 26: 57-61. 1920.—As far as possible the names of the *Rosaceae* are traced to their origin.—S. P. *Nichols*.

716. CLUTE, WILLARD N. Plant names and their meanings, IV. *Rosaceae II*. See Bot. Absts. 6, Entry 715. *Amer. Botanist* 26: 90-94. 1920.

717. T(ANSLEY), A. G. Elementary lecturing with the help of schedules. [Rev. of: CHURCH, A. H. *Elementary notes on structural botany*. Oxford Bot. Mem. No. 4. Oxford Univ. Press. 1919. *Elementary notes on the reproduction of Angiosperms*. IBID. No. 5. 1919.] *New Phytol.* 19: 44-46. 1920.—It is recommended that in teaching elementary classes an accurate and full synopsis of each lecture be given to each student before the lecture is delivered.—I. F. *Lewis*.

718. WEATHERWAX, PAUL. A method of teaching diffusion and osmosis in connection with biological work. *Proc. Indiana Acad. Sci.* 1918: 88-92. 1920.—The author discusses briefly the history of diffusion and osmosis and then by means of well-known experiments works out definitions. Diffusion, he says, is "the dispersal of the particles of one substance among the particles of another substance, without aid from external sources," while osmosis is "the diffusion of two fluids through a membrane that tends to be semipermeable." The student should be led to connect these processes with the structure of the cell and to realize that all the life processes of the plant that involve exchange of fluids between cell and environment depend upon the selective influence of semipermeable membranes.—F. C. *Anderson*.

CYTOLOGY

GILBERT M. SMITH, *Editor*GEO. S. BRYAN, *Assistant Editor*

719. AGAR, W. E. *Cytology, with special reference to the metazoan nucleus.* XII + 224 p. MacMillan and Co.: London, 1920. \$4.00.

720. BAYLISS, W. M. *The properties of colloidal systems. IV. Reversible gelation in living protoplasts.* Proc. Roy. Soc. London B, 91: 196-201. 1920.—The author describes use of intense dark ground illumination to reveal Brownian movement of minute particles in apparently clear pseudopodia of *Amoeba*. He describes a temporary gelation of this protoplasmic sol (cessation of Brownian movement) by suitable electrical stimulation, and discusses subject in general. Plant cells, because of walls, are not so suitable for intense dark ground illumination, but *Nitella* and stamen hairs of *Tradescantia* are fairly satisfactory.—*Paul B. Sears.*

721. DONCASTER, L. *An introduction to the study of cytology.* 280 p., 24 pl., 31 fig. University Press: Cambridge, 1920. \$8.50.

722. C., A. H. [Rev. of: DONCASTER, L. *An introduction to the study of cytology.* 280 p., 24 pl., 31 fig. University Press: Cambridge, 1920.] Jour. Bot. 58: 205-206. 1920.

723. G., J. B. *British cytology.* [Rev. of: DONCASTER, L. *An introduction to the study of cytology.* XIV + 280 p., 24 pl. University Press: Cambridge, 1920.] Nature 105: 190-191. 1920. "Not intended as a text book though it contains a wealth of facts; but its aim is to interest the senior student by pointing out the way in which cytology is related to the great fundamental problems at the root of all biological research.—O. A. Stevens.

724. CARTER, NELLIE. *Studies on the chloroplasts of Desmids. IV.* Ann. Botany 34: 301-319. 3 pl. 1920.—In this the last of a series of four articles on the chloroplasts of the Desmidiaceae (See Bot. Absts. 4, Entry 166 and 6, Entry 1191) the structure of the chloroplast of *Staurastum* is taken up. In sixteen of twenty-two species discussed there is a fairly massive central axial chloroplast, typically with one pyrenoid, from which a more or less definite lobe arises opposite each angle of the cell. This lobe is forked, and very often the forking is so deep that the lobe appears as two masses or plates arising from the central axis of the chloroplast. Exceptional cases are found primarily in the larger species of the genus. Thus in *S. Ophiura* Lund. the chloroplast lobes are between and not opposite the arms of the cell, while in *S. Arctiscon* (Ehr.) Lund. there is only one projection into each arm of the cell. Owing to the greater size of the lobes and reduction of the central mass in *S. sexangulare* (Bulnh.) Lund. and *S. anatinum* Cke. & Wills, pyrenoids are not found in the central mass but in the lobes. In *S. grande* Bulnh. the chloroplasts are parietal, although in very young semi-cells there is a central mass. Another quite unusual arrangement is that found in *S. tumidum* Breb., where there are from twelve to fifteen or more chloroplasts in the form of narrow bands running through the semi-cell.—The final portion of the paper is devoted to a discussion of chloroplast division in the whole family. In the Saccodermatae, division of the chloroplast starts before division of the nucleus. In the Placodermatae, nuclear division is completed and the new semi-cells have begun their development before there is any indication of chloroplast division. Division in this subfamily is not by constriction but by a budding of the chloroplast into the new semi-cell until the chloroplast volume is the same in the new and old semi-cells, when there is a division at the cell isthmus. At the time when the chloroplast begins to grow into the new semi-cell the pyrenoid gives off a small bud which, soon after its separation, grows in volume until it reaches the size of the original pyrenoid.—*Gilbert M. Smith.*

725. FARR, WANDA KIRKBRIDE. Cell-division of the pollen-mother-cell of *Cobaea scandens alba*. Bull. Torrey Bot. Club 47: 325-337. Pl. 14. 1920.—A review is given of literature on cytokinesis in pollen-mother-cells with special reference to cell-plate formation and cleavage. Author reports that in *Cobaea scandens alba* furrowing was observed in formation of the tetrad, but that the cell-plate was not apparent during cytoplasmic division.—P. A. Munz.

726. GATES, R. R. The structure of the nucleus. [Rev. of: AGAR, W. E. Cytology: with special reference to the metazoan nucleus. XII + 224 p. Macmillan and Co.: London, 1920.] Nature 105: 482-483. 1920.

727. GAUDISSERT, P. Réseau protoplasmique et chondriosomes dans la genèse des myofibrilles. [Protoplasmic reticulum and chondriosomes in the genesis of muscle fibers.] La Cellule 30: 29-43. 2 pl. 1915-1919.—An investigation of the rôles played by (1) the reticular or alveolar protoplasmic substratum and (2) the granular elements (mitochondria) in the development of muscle fibers in the chick embryo, each element having been held to be exclusively responsible by different workers. The author concludes "that the muscle fibers arise neither exclusively from a protoplasmic reticulum, nor exclusively from mitochondria or other granular elements, but that they result from the cooperation of mitochondria with a reticular structure, different, at least at first, from the mitochondria themselves. It is the reticulum . . . which, in orienting itself, furnishes the chief outline of the muscle fibers; but, on their part, the mitochondria, in fixing themselves on this reticulum, furnish certain substances which are incorporated in it and contribute to the development of the myofibrils." It is not true that "each myofibril is only a modified filamentous chondriosome" (DUESBERG).—L. W. Sharp.

728. GUILLIERMOND, A. Sur l'origine mitochondriale des plastides à propos d'un travail de M. Mottier. [Concerning the mitochondrial origin of plastids with regard to Mottier's work.] Ann. sci. nat. bot. X. 1: 225-246. 5 pl., 10 fig. 1919.—Author considers as inexact MOTTIER's view based upon a study of meristematic cells in pea, that mitochondrial elements and "plastid primordia" are distinct and independent entities in cytoplasm. An *a priori* objection to MOTTIER's theory is that in animals mitochondria appear to be concerned in elaboration of products of secretion of cell, acting similarly to plastids; and, moreover, a majority of animal pigments originate in mitochondria. Author then points out that size is no reliable criterion for distinguishing mitochondria and "plastid primordia" as MOTTIER argues. Mitochondria vary in size, and he has observed such cytoplasmic bodies in animals of similar size to those in plants that are "plastid primordia." In general, author considers that diverse forms of mitochondria have a common origin and, in particular, plastids have a mitochondrial origin.—J. P. Kelly.

729. GUILLIERMOND, A. Observations vitales sur le chondriome d'une Saprolegnicacée. [Observations of chondriosomes in a living Saprolegnia.] Compt. Rend. Acad. Sci. Paris 170: 1329-1333. 5 fig. 1920.—Granules, rods, and filaments are made visible in the living material by staining with neutral red and cresyl blue. The latter differentiates the metachromatic bodies from the chondriosomes.—C. H. Farr.

730. HARTMANN, MAX. Untersuchungen über die Morphologie und Physiologie des Formwechsels (Entwicklung, Fortpflanzung, Befruchtung und Vererbung) der Phytomonadinen (Volvocales). Programm der Untersuchungen und I. Mitt.: Über die Kern- und Zellteilung von *Chlorogonium elongatum* Dangeard. [Investigations on the morphology and physiology of variation in form (development, reproduction, fertilization, and heredity) of the Phytomonadineae (Volvocales). Program of the investigation and first contribution; On the nuclear and cell division of *Chlorogonium elongatum* Dangeard.] Arch. Protistenk. 39: 1-33. 3 pl., 2 fig. 1919.—After a short prospectus of a proposed series of investigations on the morphology and physiology of the Phytomonadineae, the author proceeds to a description of cell and nuclear division in *Chlorogonium elongatum* Dang. The first indication of cell division is

the disappearance of the pyrenoid, while at the same time the nuclei enter the prophases of division. After the nuclear division is completed, cytokinesis takes place at right angles to the long axis of the cell. The two daughter cells grow in length, and then the nucleus of each divides again, the long axis of the spindles generally lying parallel to the recent line of cleavage. This nuclear division is followed by cell division in each of the daughter cells. HARTMANN emphasizes the unusual behavior of the pyrenoid during this process, since in *C. elongatum* it completely disappears during division and is then formed anew in the daughter cells. In other Volvocales, on the other hand, there is a division of the pyrenoid. The resting nucleus contains 10-20 small granules that fuse to form ten larger granules which are the chromosomes. This fusion of granules is not in the nature of a reduction division. The origin of the spindle is intranuclear, and it frequently has but one pole in early stages. Nuclear history from the metaphase onward is of the usual type.—*Gilbert M. Smith.*

731. HERLANT, M. Le cycle de la vie cellulaire. Recherches physiologiques sur la division de la cellule. (Note preliminaire.) [The cycle of cellular life. Physiological researches on the division of the cell. (Preliminary note.)] Ann. et Bull. Soc. roy. Sc. med. et nat. Bruxelles 4: 112-117. 1920.—The author has sought to determine whether the permeability of the cortical layer of the protoplasm is constant during the entire duration of the cellular cycle. He has observed that the plasma membrane of the egg of the sea urchin is, according to the stage of the cell life, sometimes permeable and sometimes impermeable to salts. The lipid state (semipermeable) and the albuminoid state (permeable) of the plasma membrane do not co-exist, but succeed each other periodically in the course of the cellular life. The physico-chemical equilibrium of the protoplasm, and not alone that of the cortical layer, depends in part on factors destroyed by the insoluble substances in the lipoids (permeable phase) and in part on factors destroyed by the solvents of the lipoids (semipermeable phase). These phenomena are in accordance with the emulsion theory of protoplasm.—*Henri Michéels.*

732. KOWALSKI, J. Cinèses atypiques dans les cellules adiposes de larves de *Pyrrhocoris apterus* L. avec quelques remarques sur le centrosome. [Atypical mitoses in the adipose cells of the larvae of *Pyrrhocoris apterus* L. with some remarks on the centrosome.] La Cellule 30: 83-119. 2 pl. 1915-1919.—Author describes and figures a considerable variety of abnormal mitotic phenomena observed in the adipose cells of the larva of *Pyrrhocoris*. The abnormalities are of two main types: asymmetrical bipolar figures and multipolar figures. These result in irregular distributions of the chromatin to the daughter cells, the frequent loss of chromosomes in the cytoplasm, unequal cell division, and the formation of hypo- and hyperchromatic cells. Such aberrant behavior is apparently due to two causes—the asymmetrical bipolar figures, to the mechanical action of the numerous large fat vacuoles; and the multipolar ones, to the disturbing action of a toxin secreted by bacteria which infect the larvae. Cells showing the abnormal phenomena do not return to the embryonic state or divide normally.—The normal resting adipose cell has large fat vacuoles, comparatively scanty cytoplasm, and from 1 to 4 nuclei. The nuclear reticulum stains very faintly. From 7 to 9 (sometimes more) chromatic nucleoli are present; the total amount of nucleolar material is about constant in all the nuclei. The chromosomes number 24—16 of them are rod-shaped and 8 are small and spherical. The latter are difficult to distinguish from the nucleoli, which appear to contribute to the formation of the chromosomes.—A number of observations on normal and abnormal mitotic phenomena in these cells lead to the following conclusions regarding the centrosome and achromatic figure: The formation of the spindle accompanying the development of the chromosomes is the manifestation of a universal and fundamental condition present in all plant and animal cells dividing mitotically; namely an intense and polarized metabolic interchange between chromatin and cytoplasm, showing itself in the bipolarized arrangement of the fibers of the cytoplasmic reticulum. There are two similar opposed cones of fibers because the metaphase chromosomes are split into two equal masses with equal metabolic actions on the cytoplasm; when the chromatic masses are unequal the cones are unequal, and if for any reason they are more than two in number, the figure

has more than two poles. The spindle figure is the visible morphological expression of invisible currents of exchange passing between chromosomes and cytoplasm. The aster is a similar expression of a metabolic current in the opposite direction, from the cytoplasm toward the chromatic mass. The two currents meet at the poles of the cell, which are therefore regions of relative calm. If exchanges between chromosomes and cytoplasm cause a deposition of a visible chemical substance, it accumulates at these regions; such deposits are the centrosomes. If more material is deposited than is used by the cell during division, the centrosome is a permanent organ; otherwise it is not. The centrosome is thus neither exclusively cytoplasmic nor exclusively nuclear in origin, but comes from both as a precipitation of substances resulting from the metabolic exchange between the two. Chemical reactions, manifesting themselves in centrifugal currents of exchange between centrosome and cytoplasm, cause the appearance of the attraction sphere. When the chromatic mass divides, a second current of exchange is set up toward the centrosome, and a second centrosome is deposited near the first; the assumption of centrosome division is not necessary to account for the two. The formation of centrosomes seems to be conditioned by the size of the spindle cone, the cone in turn being proportional to the chromatic mass under whose influence it arises. The size of the centrosome is often observed to be proportional to that of the chromatic mass. The disposition and orientation of the chromatic masses determines the orientation of the spindle, and the location and size of the centrosome.—Attention is called to the relationship between centrosome and nucleolus. In some lower organisms a single "nucleolocentrosome" performs the functions of both, whereas by a division of labor two separate organs have become differentiated in most organisms.—*L. W. Sharp.*

733. LADREY, F. *La Cellule complexe symbiotique.* [The symbiotic cell complex.] *Compt. Rend. Acad. Sci. Paris.* 169: 665-667. 1919.—From a review of his own work and that of others, the author concludes that the cell complex consists of various elements—the cytoplasm, nucleus, chondriosomes, etc.—which bear a symbiotic relation to one another and derive benefit from one another.—*V. H. Young.*

734. MEYER, ARTHUR. *Morphologische und Physiologische Analyse der Zelle der Pflanzen und Tiere.* [Morphological and physiological analysis of the cell of plants and animals.] *XX + 629 p., 205 fig.* Gustav Fischer: Jena, 1920. (38 marks.)

735. RHUMBLER, L. *Otto Bütschli's Wabentheorie.* [Otto Bütschli's alveolar theory.] *Naturwissenschaften* 8: 549-555. 1920.

736. SPEK, JOSEF. *Über Bütschli's Erklärung der karyokinetischen Figur.* [On Bütschli's explanation of the karyokinetic figure.] *Naturwissenschaften* 8: 561-562. 1920.

737. SPEK, JOSEF. *Ueber physikalisch-chemische Erklärungen der Veränderungen der Kernsubstanz.* [Concerning physico-chemical explanations of the changes of the nuclear substance.] *Arch. Entwicklungsmech.* 46: 537-546. 1920. This is mainly, though not exclusively, a discussion of PAOLO DELLA VALLE's work entitled "La morfologia della cromatina dal punto di vista fisico" (*Arch. Zool. Ital.* 6: 37-321. 1912.) The general nature of the nuclear substances, the number and size of chromosomes, susceptibility of chromosomes to stains, division of chromosomes, individuality of chromosomes, and other similar subjects are briefly considered by the author.—*John H. Schaffner.*

738. VAN HOOF, L. *La spermatogénèse dans les mammifères. III. Les spermatocytes leptotènes et amphotènes dans le Taureau.* [Spermatogenesis in the mammals. III. The leptotene and amphotene spermatocytes in the bull.] *La Cellule* 30: 7-25 1 pl. 1915-1919.—Author reexamines the "quaternary granulations" described by SCHOENFELD (1901) in the nuclei of the spermatocytes of the bull and finds them to be merely the symmetrically arranged thickenings of the amphotene threads. In the nuclei of the spermatogonia and spermatocytes the chromatin takes the form of irregular blocks with a few thin strands. In the heterotypic prophase the leptotene threads develop at the expense of these blocks, vestiges of which may

remain visible for some time, and soon take on a more or less definite polar orientation. Lateral pairing of the threads begins at their free ends and gradually involves all parts. The granules or thickenings of the associating threads show a correspondence in position, which gives them the appearance not only of tetrads such as SCHOENFELD thought to be of peculiar significance here, but also of dyads, hexads, and octads. As the threads pass into the pachynema stage these thickenings gradually become less conspicuous. The interpretation of SCHOENFELD is attributed in large part to faulty fixation.—*L. W. Sharp.*

739. YAMAHA, GIHEI. Einige Beobachtungen über die Zellteilung in den Archesporen und Sporenmutterzellen von *Psilotum triquetrum* Sw. mit besonderer Rücksicht auf die Zellplattenbildung. [Some remarks on the cell division in the archesporial and spore mother cells of *Psilotum triquetrum* Sw. with special regard to the formation of the cell plate.] Bot. Mag. Tokyo 34: 117-129. 20 fig. 1920.—The cells of *Psilotum* are specially adapted for cytological work because of the large nuclei, that are rich in chromatin. The rod-shaped elements of the cell plate are very persistent. In the heterotypic division of the archespore the so-called nucleolar substance could be traced near the daughter nuclei. The phragmoplast can be traced back to the chromosome-connecting filaments. These filaments divide longitudinally, starting at the equatorial plane. At this stage a large number of "extranucleoli" were observed. The daughter nuclei approach each other more or less; the cell plate becomes more conspicuous; while its granular contents, the dermatosomes, are very clear. In the meiosis no "radial fibres" were observed. The dermatosomes seem to be used up in the formation of the cell plate, which precedes the simultaneous formation of the cell wall. The homeotypic division shows the same peculiarities. The shrinkage of the wall of the spore mother cell seems to cause the separation of the tetrads.—*L. G. Baas-Becking.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

740. ADAMSON, R. W. The *Bartram oak*. Sci. Amer. 122: 301. 1920.—See Bot. Absts. 6, Entry 1564.

741. ALGAN, H. Bibliographie. [Rev. of: HUFFEL, G. Économie forestière. (Forest economy.) Tome premier, deuxième volume, deuxième édition. 461 p. 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 196-202. 1920.—Nearly two-thirds of this important work is devoted to a discussion of the history of forest property and forest legislation from the beginning of the feudal period to the middle of the nineteenth century. Forest policy is discussed at some length, including the relation of forests to the public welfare, public control of private cuttings, public assistance to private owners, forest taxation, etc. The final part of the volume contains a wealth of statistics as to the extent, distribution, and ownership of French forests.—*S. T. Dana.*

742. ANDREWS, F. M. Some trees of Indiana. Proc. Indiana Acad. Sci. 1918: 261-263. 1920.

743. ANONYMOUS. The forestry commission. Nature 105: 215-216. 1920.—Outline of program for 1919-20 with personnel of consultative committees for England, Scotland, Wales, and Ireland. About 34,000 acres of afforestable land are being acquired.—*O. A. Stevens.*

744. ANONYMOUS. Forestry, tree diseases and timber. [Rev. of: (1) BOERKER, R. H. D. Our national forests. A short popular account of the work of the United States forest service on the national forests. XIV+238 p. Macmillan and Co.: London and New York, 1918. (2) STEBBING, E. P. Commercial forestry in Britain: its decline and revival. VI+186 p. John Murray: London, 1919. (3) WEBSTER, A. D. National afforestation, 160 p. T. Fisher Unwin: London, 1919.] Nature 105: 577-579. 1920.

745. ANONYMOUS. Forestry, tree diseases and timber. [Rev. of: DAVIES, J. H. A map of the world (on Mercator's projection), having special reference to forest regions and the geographical distribution of timber trees. Timber map, No. 1. North America, timber map, No. 2. South America, timber map, No. 3. Europe and Africa, timber map, No. 4. Each on rollers 40 x 30 in. W. and A. K. Johnston: Edinburgh. Macmillan and Co.: London. No date.] Nature 105: 579. 1920.—Distribution of a number is incorrect, and names are erroneous or confusing. European larch does not occur, as shown, in the Pyrenees, Apennines, Serbia, Bulgaria, etc. *Larix dahurica* should be *L. sibirica*. *L. leptolepis* is represented on Hokkaido where there is no larch, and in Manchuria and Korea where the finest *L. dahurica* grows.—O. A. Stevens.

746. ANONYMOUS. Forestry, tree diseases and timber. [Rev. of: RANKIN, W. H. Manual of tree diseases. XX + 398 p. Macmillan and Co.: New York and London, 1918.] Nature 105: 579. 1920.—See Bot. Absts. 7, Entry 1168.

747. ANONYMOUS. [German rev. of: REUSS. 37-jährige Fichtenreinzuchtversuche in Österreich. (37-year experiment in pure breeding of pine trees in Austria.) Centralbl. Gesamte Forstw. 1916: 383-417. 1916.] Zeitschr. Pflanzenzücht. 6: 194. Dec., 1918.—See Bot. Absts. 6, Entry 1607.

748. ANONYMOUS. [German rev. of: URBAN, J. Über die Grösse der Stecklinge. (On the size of cuttings.) Zeitschr. Zuckerindust. Böhmen 42: 521-526. 1918.] Zeitschr. Pflanzenzücht. 6: 195-196. Dec., 1918.—See Bot. Absts. 6, Entry 1612.

749. ANONYMOUS. El mezquite. [Mesquite.] Agric. Mexicano y Hogar 36: 105-108. 1920.—Translated and adapted from the Scientific American.

750. ANONYMOUS. Le pin sylvestre. [The Scotch pine.] Rev. Eaux et Forêts 58: 161-162. 1920.—Artificial reforestation of Scotch pine can be largely or perhaps wholly avoided by the clear cutting of long narrow strips, lying at right angles to the direction of the prevailing winds. For example, a stand with a rotation of 60 years might be divided into six groups, arranged in two tiers and each containing ten cutting areas or strips. The first year the strip in Group 1 lying farthest from the source of the prevailing winds would be cut; the next year the similarly situated strip in Group 2; and so on. Six years would thus elapse between the cutting of adjacent strips in the same group. This should be ample to allow for natural regeneration, which could be still further assured by leaving along roads and the edges of the strips a few seed trees to hold over a second rotation. The system is flexible and can be easily adapted to different rotations and to biennial and triennial cuttings, etc.—S. T. Dana.

751. ANONYMOUS. Résultats des expériences faites, le 9 juin 1920, dans la forêt domaniale de Lamotte-Beuvron (Loir-et-Cher). [Results of experiments in the state forest of Lamotte-Beuvron.] Rev. Eaux et Forêts 58: 268-271. 1920.—Stumps can be extracted by the use of explosives at a net cost of about 1.5 francs per stump. The method can be used to advantage for the removal of a limited number of stumps, but is too slow and expensive for the clearing of large areas. The latter can be cleared more cheaply (net cost about 75 francs per stump), and satisfactorily by the use of caterpillar tractors, which might also apparently be used to advantage for the felling of standing timber. Holes for the planting of large trees, especially fruit trees, can be prepared by the use of explosive cartridges containing small amounts of mineral fertilizer.—S. T. Dana.

752. ANONYMOUS. The fruiting of the Ginkgo at Kew. Kew Bull. Misc. Inf. [London] 1920: 47-48. 1 fig. 1920.—See Bot. Absts. 6, Entry 1839.

753. ANONYMOUS. Beschädigungen an Eichen durch *Diaporta taleola* Tul. [Injury to oak by *Diaporta taleola* Tul.] Schweiz. Zeitschr. Forstw. 69: 62-63. Frontispiece. 1918.—See Bot. Absts. 6, Entry 1932.

754. AUBERT, C.-G. *La conversion des taillis en futaie dans l'ouest de la France.* [Conversion of coppice into high forest in western France.] *Rev. Eaux et Forêts* 58: 124-132, 153-160, 189-194, 227-234. 1920.—The value of the high forest, long advocated by the leading French foresters as the forest *par excellence*, was conclusively demonstrated by the recent war, during which it was primarily the high forests under state ownership that supplied the enormous quantity and wide variety of forest products required by France and its allies. For both public and private owners the high forest is superior to coppice in the quantity, quality, and variety of its products, in its proportionately smaller cost of protection and greater production, and in its flexibility of management, which is particularly valuable in times of economic stress. The objection that it yields too low a rate of interest has lost much of its force in these days when timber prices are so high and most other investments so insecure. Some sacrifice of annual revenue is involved during the period of conversion, but this is purely temporary, can be minimized by proper handling, and really consists of an addition to the forest capital comparable to a savings bank investment. Cultural difficulties are more serious, but are due largely to the attempt to bring about the conversion through the establishment by natural reproduction of seedling stands with a regular distribution of age classes.—The state forests of Bourse and of Écouves prove that, at least in the oak and beech stands of western France, the establishment of satisfactory high forests from thrifty trees of sprout origin is not only comparatively easy from a cultural point of view, but can be effected at a considerable saving of time and money. The conversion can be brought about either by allowing the stand of coppice to keep right on growing, with occasional thinnings to prevent its becoming too dense; or by making a "conversion cutting" which would remove the bulk of the trees, leaving several hundred carefully selected reserves to the hectare, most of which would be of the same age as the main stand. The latter method has the advantage of yielding an immediate revenue and of affording the best possible growing conditions for the trees left. One area treated in this way which had to be prematurely clear cut 38 years later during the war yielded 4000 francs per hectare, exclusive of previous thinnings, as against an estimated yield of 1200 francs per hectare had the conversion not been undertaken. With suitable species, vigorous trees, and good soil, the method is applicable to private as well as to public forests. When conditions are unfavorable in these respects clear cutting and planting or underplanting with silver fir is usually necessary.—Private owners, who will ordinarily make the "conversion cuttings" from five to ten years earlier than the State, will find it advantageous to leave a larger number of reserves, say 1000 per hectare in a 23-year-old stand. It is usually advisable to remove old reserves already on the ground, not only because of the revenue to be derived from them but because their subsequent growth is likely to be unsatisfactory and to interfere with the best development of the rest of the stand. In selecting reserves to be retained, the species and general vigor of the trees are more important than their origin. The object of the method is not to obtain a stand of natural seedlings in some far off future, but to effect the immediate conversion of a coppice stand into high forest with a view to securing the maximum yield of timber.—S. T. Dana.

755. BAKER, E. *Methods of fire protection, with special reference to fires caused by sparks from railway engines.* *Jour. Dept. Agric. Union of South Africa* 1: 414-421. 5 fig. 1920.

756. BALERIOLA, GASPAR. *La poda de las morreras.* [Mulberry pruning.] *Informacion Agric. [Madrid]* 10: 218-220. 4 fig. 1920.—The method of pruning mulberry trees to secure the maximum yield of leaves for silk-worm culture is described.—John A. Stevenson.

757. BARBEY, A. *Chronique suisse.* [Swiss notes.] *Rev. Eaux et Forêts* 58: 136-138. 1920.—The economic crisis in Switzerland caused by the war still continues, with high prices for both timber and firewood and comparatively little building activity. While forest devastation has not been general, it is necessary to use every means to make the forests more productive. By more intensive management, made possible largely by decreasing the area under the supervision of each forest officer, it should be feasible to increase the annual

production of the public forests from 2.7 to 4.4 million cubic meters, thus making the country independent of wood imports aside from exotic timbers. The recently created "central forest office," with headquarters at Soleure, should prove effective in supplementing other activities to awaken public interest in and support of the practice of better forestry.—*S. T. Dana.*

758. BARBEY, A. *Wald und Schlachtfeld.* [Forest and battlefield.] Schweiz. Zeitschr. Forstw. 71: 257-261. 4 pl. 1920.—The forest was completely destroyed over large areas, and in other sections there are only dead parts of trees left. In France the estimated areas destroyed include 100,000 ha. state forest, 140,000 ha. community forest, and 275,000 ha. private forests; also 10,000 to 15,000 ha. in Elsass—a total of about 530,000 ha. (1,325,000 acres). This forest is so completely destroyed by shells and fire that no young growth is coming in. The area is being covered with weeds and shrubs among the tangles of barbed wire and shell holes. Utilization of the remaining dead timber is not feasible in many places unless charcoal industries are developed. Insect infestations are occurring and no doubt will spread rapidly. Reforestation with the species that occurred before will not be possible in some sections where the soil is badly torn up. Such areas may be restocked with broad-leaved species to build up the soil.—*J. V. Hofmann.*

759. BEAN, W. J. One-leaved ash (*Fraxinus excelsior heterophylla*). Kew Bull. Misc. Inf. [London] 1919: 390-391. 1919.—See Bot. Absts. 6, Entry 1631.

760. BEAN, W. J. Garden notes on new or rare trees and shrubs. Kew Bull. Misc. Inf. [London] 1920: 119-124. 1920.—See Bot. Absts. 6, Entry 1843.

761. BERKHOUT, A. H. Het meten der boomen in verband met hun aanwas. [The measurement of trees in connection with their growth.] Meded. Landbouwhoogeschool en Verbond. Instit. Deel 17: 109-225. 1920.—Uses the standard deviation of individual varieties and of the mean as a measure of reliability. Uses the "correlation factor" in examining relationship such as that between diameter and volume, with coefficients as high as 0.98. Shows the correlation graphically in addition. In some other correlations the values are much lower. "It is indeed unfortunate that in forest mensuration use of probability computations is seldom or never made, for they are especially applicable in forestry."—*Carl Hartley.*

762. BINTNER, J. Silver leaf disease. *Stereum purpureum*. Kew Bull. Misc. Inf. [London] 1919: 241-263. Pl. 8, fig. 1-8. 1919.—See Bot. Absts. 6, Entry 1936.

763. BOULGER, G. S. [Rev. of: HENRY, AUGUSTINE. *Forests, woods and trees in relation to hygiene.* xii + 314 p., 50 illus. Constable & Company: London, 1919.] Jour. Bot. 58: 157-158. 1920.

764. BOULGER, G. S. [Rev. of: STONE, HERBERT. *A guide to the identification of our more useful timbers, being a manual for the use of students of forestry.* 72 p., 3 pl. University Press: Cambridge, 1920.] Jour. Bot. 58: 230. 1920.

765. BROWN, FOREST B. H. The silicious skeleton of tracheids and fibers. Bull. Torrey Bot. Club 47: 407-424. 5 fig. 1920.—See Bot. Absts. 7, Entry 1057.

766. BURNS, GEORGE P. Tolerance of forest trees and its relation to forest succession. Jour. Forestry 18: 610-615. 1920.—A general review of the literature shows a general disagreement as to the meaning of the term *tolerance*. It is used rather indiscriminately in forestry practice but has been tied up with light more often than otherwise. No clear definition has been given and much confusion caused, and the question of what is meant and how it is brought about will have to be solved by forest research.—*E. N. Munns.*

767. CAMBAGE, R. H. Notes on the native flora of New South Wales. Part 10. The Federal Capital Territory. Proc. Linnean Soc., New South Wales 43: 673-711. Pl. 71-74. 1918.—See Bot. Absts. 6, Entry 1515.

768. CARDOT, E. La reconstitution forestière. [Forest reconstruction.] Rev. Eaux et Forêts 58: 121-123. 1920.—The efforts of the Administration of Waters and Forests, following the Franco-Prussian war, to convert the stands of coppice in the national forests into high forest yielded comparatively small results. This was primarily caused by an exaggerated idea of the loss in annual revenue that would be necessitated by the conversion, by the attempt to use a complicated system of management by natural regeneration with regular thinnings and an even distribution of age classes, and by the many practical difficulties encountered in putting this system into effect. A series of articles starting in this issue of the Revue points out a simple, practical system of avoiding these difficulties and of effecting the conversion with purely temporary and insignificant reductions in current revenue. While the author apparently claims the system to be effective only in western France, it would seem to be applicable, with slight modifications, to most, if not all, of the coppice stands in the country.—S. T. Dana.

769. CHEESEMAN, T. F. Contributions to a fuller knowledge of the flora of New Zealand: no. 6. Trans. and Proc. New Zealand Inst. 51: 85-92. 1919.—See Bot. Absts. 6, Entry 1516.

770. CRIBBS, JAMES E. Ecology of *Tilia americana*. I. Comparative studies of the foliar transpiring power. Bot. Gaz. 68: 262-286. 13 fig. 1919.—See Bot. Absts. 6, Entry 1495.

771. DE BRUN, H. Contre les incendies en Vaucluse. [Fire protection in Vaucluse.] Rev. Eaux et Forêts 58: 264-267. 1920.—The application of the forest fire laws of 1893, 1898, and 1902 should be extended to include the department of Vaucluse. Every effort should be made to prevent fires from starting by prohibiting smoking in the forest and by delaying the opening of the hunting season; and to control them after they have started by organizing permanent fire-fighting crews composed of local volunteers. These crews should be specially trained for their work and should be paid by the communities concerned, which should, however, be assisted by subsidies from the state and the department.—S. T. Dana.

772. DE LA HAMELINAYE, H. Rapport du diamètre à 1^m 30 au diamètre de la souche. [Relation between breast high and stump diameters.] Rev. Eaux et Forêts 58: 133-135. 1920.—Measurements of a large number of stumps of oak and beech in the forests of Gers-Hautes, and Basses-Pyrénées showed that the sum of the largest and smallest stump diameters, measured at the surface of the ground, was approximately equal to the sum of the circumferences of the same trees measured at breast height (1.30 m.). In other words, the average diameter at breast height in the case of these two species was equal to 63 per cent of the mean diameter of the stump at the surface of the ground.—S. T. Dana.

773. DEMORLAINE, J. La sylviculture et les chars d'assaut. [Silviculture and tanks.] Rev. Eaux et Forêts 58: 235-236. 1920.—During the war the forest of Compiègne was used as a practice field for tanks, the caterpillars of which broke up the ground so as to form an excellent seed bed. As a result the heavy beech-nut crop of 1918 was followed by the establishment of a remarkably dense stand of seedlings. This suggests the possibility of using tanks regularly in beech and oak forests during good seed years in order to stir up the soil and thus favor natural reproduction, at the same time giving the tanks an opportunity to practice their maneuvers under difficult conditions. Similarly, caterpillar tractors might be used to advantage from a silvicultural point of view for the hauling of logs in lumbering operations.—S. T. Dana.

774. DETWILER, SAMUEL B. White pine blister rust control in 1919. Amer. Plant Pest Committee Bull. 4: 1-10. 1920.—See Bot. Absts. 7, Entry 1224.

775. DORE, W. H. The distribution of certain chemical constants of wood over its proximate constituents. Jour. Indust. Eng. Chem. 12: 472-476. 1920.—A study is made of the distribution of the groups contained in red wood which yield furfural acetic acid and methoxy with the object of learning their relation to the constituent cellulose and lignin.—*Henry Schmitz*.

776. DORE, W. H. The proximate analysis of coniferous woods. Jour. Indust. Eng. Chem. 12: 476-479. 1920.—An improved procedure is described for the summative analysis of coniferous woods. Methods are given for the estimation of the following constituents: those lost on drying, benzene extract, alcohol extract, cellulose, lignin, soluble pentosans, mannan and galactan.—*Henry Schmitz*.

777. DORE, W. H. The proximate analysis of hardwoods: Studies on *Quercus agrifolia*. Jour. Indust. Eng. Chem. 12: 984-987. 1920.—The methods previously used for the analysis of coniferous woods were investigated as to their applicability to the hardwoods. The purification treatment employed for the tissues of coniferous woods was supplemented with digestion in cold water and 5 per cent sodium hydroxide solution. Lignin was determined by the gaseous hydrochloric acid method recently proposed by KÖNIG and BECHER. This modified method was found satisfactory in every respect.—*Henry Schmitz*.

778. DUPLER, A. W. Staminate strobilus of *Taxus canadensis*. Bot. Gaz. 68: 345-366. 3 pl., 22 fig. Nov., 1919.—See Bot. Absts. 6, Entry 1898.

779. EHRHORN, E. M. Notes on plant shipment. Hawaiian Forester and Agric. 17: 4-6. 1920.—See Bot. Absts. 6, Entry 1942.

780. ENGLER, A. Die Vegetationsverhältnisse des Kongoa-Gebirges und der Bambuto-Berge in Kamerun [West Africa]. [The vegetation of the Kongoa Mountains and the Bambuto Mountain in Kamerun.] Bot. Jahrb. 55 (Beiheft): 24-32. 1919.—See Bot. Absts. 6, Entry 1505.

781. EWART, A. J. Contributions to the flora of Australia, No. 27. Proc. Roy. Soc. Victoria 31 (N. S.): 367-379. Pl. 18. 1919.

782. FANKHAUSER, F. Der Lawinenverbau Mittels Terrassen. [Preventing avalanches by terracing.] Schweiz. Zeitschr. Forstw. 71: 217-230. 8 pl. 1920.—Avalanches occurred quite frequently near Elm on slopes from 70° to 90°. These slopes were covered with unbroken sod which give little resistance to sliding snow. Terracing has been successful in preventing slides here and elsewhere. Terraces were first built as early as 1756. They were constructed of laid walls of rock and were only partially successful. Later walls were built of well-laid rock with widened bases. These were often loosened and torn away in the course of two or three seasons. The best construction has been found to consist of alternate layers of rock and sod, with the sod blocks projecting over the rock so that the grass will grow over the entire wall the first or second season. If the sod blocks are trimmed even with the rock wall, the wall soon crumbles and settles irregularly, because the grass does not grow over it and bind the dirt together. The walls are from 1 to 2 m. wide and about 8 m. high, with a slope of about one-fourth the thickness of the wall. The base is set deep enough to prevent undermining by rain and snow water. The terraces are made as broad as possible, in order to give the snow more level bearing surface and prevent sliding.—*J. V. Hofmann*.

783. FLURY, PHILIP. Aus dem Gebiete unserer Forsteinrichtung. [From the Division of Forest Improvement.] Schweiz. Zeitschr. Forstw. 71: 137-150. 1920.—This article is a discussion of the views of BROLLEY and BURGER on forest management and improvement as related to methods of cutting. It is pointed out that the two methods are often confused. Clear-cutting may be advisable for forest management, but it is not always the most desirable for forest improvement. Also, forests may be successfully managed by selection cut-

ting, but not necessarily improved. Slope types of fir and spruce are best adapted to selection cutting and natural reproduction, and on the bottom lands hardwood types are better suited to clear-cutting and planting. Mixed forests may be converted to pure beech forests or any desirable species by this method. Annual cuttings must be based on the average increment of different age classes and not on annual increment. An age class may produce abnormal increments for short periods, but cuttings based on this would be too heavy for the entire age class. HAYER's formula is discussed in its relation to annual and age class increment.—*J. V. Hofmann.*

734. FLURY, PHILIPP. Aus dem Gebiete unserer Forsteinrichtung (Schluss). [Division of Forest Improvement (concluded).] Schweiz. Zeitschr. Forstw. 71: 179-199. 1920.—Cuttings and future yield, based on annual increment, are faulty as shown by permanent growth plots. These plots show wide fluctuation due to weather conditions. Growth was retarded in the dry years of 1904, 1906, 1908, and 1911 and greatly accelerated in the wet years of 1912-1916. Growth classes based on diameter measurement must take the smaller classes into consideration. According to the "Méthode du Contrôle" where the smallest diameter taken was 18 cm., stands under 40 years old would not be considered. Measurements taken in divisions of 5 cm. are as applicable as those based on 1 cm. and are much simpler. Cuttings based on 6- to 8-year intervals are too frequent, and no doubt 20-year intervals can be taken to better advantage. However, 10-year periods are advantageous in many conditions. Tabulations are included to show the relation of various methods of determining increment to the different methods of cutting. The author concludes that the present forest compartments are too large for the most efficient management.—*J. V. Hofmann.*

785. GHOSE, MANMATHANATH. A neglected source of sugar in Bikar. Agric. Jour. India 15: 32-39. 3 pl. 1920.—See Bot. Absts. 6, Entry 1893.

786. GLEASON, HENRY ALLAN. Some applications of the quadrant method. Bull. Torrey Bot. Club 47: 21-33. 1920.—See Bot. Absts. 6, Entry 1499.

787. GREIG-SMITH, R. The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions. Proc. Linn. Soc. New South Wales 44: 311-347. 7 fig. 1919.—See Bot. Absts. 7, Entry 1282.

788. GUINAUDEAU, CH. Souvenir de Macédoine de Salonique à la frontière Bulgaro-Serbe au point de vue forestier et agricole. [Forest and agricultural conditions in Macedonia.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 189-196. 2 fig. 1920.—Throughout most of Macedonia from Saloniki to the Bulgarian-Serbian frontier, trees are scarce, erosion is severe, and agricultural development is poor. Reforestation, restriction of grazing, irrigation, and the use of modern methods of crop production are needed to develop the very decided agricultural possibilities of this region. West of Vardor, however, is an area which is more densely populated, better forested, and richer from every point of view. Here the development of transportation facilities and the practice of better forestry and better agriculture can make it one of the flourishing parts of Greece and the source of all sorts of valuable products.—*S. T. Dana.*

789. GUYOT, CH. [Rev. of: HUFFEL, G. La forêt sainte de Haguenau en Alsace. [The sacred forest of Haguenau in Alsace.] 164 p. 1920.] Rev. Eaux et Forêts 58: 167-175. 1920.—This work gives a detailed history of the important forests of Haguenau, the area of which (18,000 hectares) has not changed materially since the Roman occupation. The methods of forest management in use at different times are fully discussed and freely criticized. The modifications introduced by the Germans following the Franco-Prussian war are regarded as particularly unfortunate, and as having undone much of the good previously accomplished by the French, in spite of the fact that the methods developed by the latter since 1843 were too theoretical and complicated.—*S. T. Dana.*

790. HALL, THOS. D. Food value of willow leaves. Jour. Dept. Agric. Union of South Africa 1: 456-457. 1920.

791. HAWLEY, L. F., AND CALDERWOOD, H. N., JR. Tar still operation in hard wood distillation plants. Jour. Indust. Eng. Chem. 12: 684-686. 1920.

792. HENKEL, J. S. Forestry in Rhodesia. Timber trees in the Umtali Park. Rhodesia Agric. Jour. 17: 335-339. 2 pl. 1920.

793. HENKEL, J. S. Forestry in Rhodesia. Two useful softwoods. Rhodesia Agric. Jour. 17: 238-243. 1920.

794. HESS, N. Experiences in plant hybridization. Proc. Amer. Soc. Hortic. Sci. 16: 52-60. (1919)-1920.—See Bot. Absts. 6, Entry 1818.

795. HILEY, W. E. The fungal diseases of the common larch. 8 vo., xii + 204 p., 73 pl. Clarendon Press: Oxford, 1920.—See Bot. Absts. 6, Entry 1947.

796. HUFFEL, G. Le mouvement forestier à l'étranger: station de recherches forestières suisse. [Developments at the Swiss forest experiment station.] Rev. Eaux et Forêts 58: 249-254. 1920.—Since 1900 the Swiss forest experiment station has been studying the influence of a forest cover on stream-flow in two neighboring and comparable water-sheds, one of which was 97 per cent and the other 29 per cent forested. Actual measurements show that forest soils in good condition absorb the bulk of the precipitation, which later runs off subterraneously; while in soils not so protected there is an immediate surface run-off accompanied by erosion and gullying, particularly on steep, turfed slopes. This beneficial influence of the forest is due to the permeability and porosity of its soil rather than to the great hygroscopicity of the humus and moss cover, which if too abundant may actually, after becoming saturated, have the opposite effect and stimulate surface run-off. During periods of rapid snow melting both the peak of the flood and the total discharge were less from the well-forested than from the poorly forested water-shed. The run-off from the former after heavy or torrential down-pours was only a third to a half of that from the latter. After prolonged rains the influence of the forest depended on whether the soil was comparatively dry or saturated at the beginning of the wet spell. In any event, however, erosion is less on well-forested water-sheds, and the flood waters from them, having a lower velocity and carrying less detritus, do less damage. During periods of prolonged drought the stream from the well-forested watershed never went dry, while that from the poorly forested one often did so for a month or two at a time. All of these differences would have been more marked if the well-forested watershed had not had appreciably steeper slopes than the other, and if the latter had been completely deforested.—S. T. Dana.

797. HUFFEL, G. Statistique des forêts de l'Alsace-Lorraine. [Forest statistics for Alsace-Lorraine.] Rev. Eaux et Forêts 58: 185-188. 1920.—The director general of forests at Strassburg has published a 98-page volume of statistical information regarding the forests of Alsace-Lorraine. Among other things this shows that the forest area of the two provinces on April 1, 1916, was 440,594 hectares, of which 31 per cent was owned by the state, 4 per cent was undivided between the state and a commune, 46 per cent was in the hands of communes and public institutions, and 19 per cent was held by private owners. Since 1871 the forest area has decreased 5,673 hectares, or slightly more than 1 per cent. During the same period gross prices of timber have increased 34 per cent and of firewood 47 per cent, but there has been a constant tendency to include smaller and smaller material in the former class. The annual yield of the forests owned by the state and of those undivided between the state and a commune is estimated at 551,422 cubic meters of large timber, including both intermediate and final products. During the war, however, the actual cut and other matters of administration were decidedly abnormal.—S. T. Dana.

798. JOHNSTON, I. M. The flora of the pine belt of the San Antonio Mountains of southern California. *Plant World* 22: 71-90, 105-122. 2 fig. 1919.—See Bot. Absts. 6, Entry 1521.

799. JOLYET, A. Les bassins d'épuration du Wacken à Strasbourg et l'élevage des Cyprinides. [The purification basins at Strassburg and the breeding of Cyprinides.] *Rev. Eaux et Forêts* 58: 195-202. 1920.—The problem of sewage disposal has been solved at Strassburg by the construction of stagnant ponds in which the organic material is assimilated by protozoans, worms, crustaceans, insect larvae, molluscs, etc., and these in turn are eaten by carp and other fish. The latter are entirely safe for human consumption and have no disagreeable taste. One hectare of pond is sufficient to dispose of the sewage from 2000 to 3000 people (nearly ten times as many as can be cared for by filtering the waste water in settling basins), and at the same time to support an abundant population of fish. This method suggests to foresters the possibility of introducing organic matter into the many ponds and streams found in the plains where communal forests cover more than 20 per cent of the land area, and of using these for the breeding of carp and other Cyprinides, which would form an important addition to the food supply of the country.—S. T. Dana.

800. K., S. L. The resin industry: utilization of sand wastes. *Australian Forest. Jour.* 3: 172-175. 1920.—A brief discussion of the resin industry, and a short description of the methods of collecting and refining resin.—C. F. Korstian.

801. LECOMTE, HENRI. Sur la "structure étagée" de certains bois. [On the "storied structure" of certain woods.] *Compt. Rend. Acad. Sci. Paris* 170: 705-709. 1920.—See Bot. Absts. 6, Entry 1901.

802. LEDERMANN, C. Einiges von der Kaiserin-Augusta-Fluss Expedition [New Guinea.] [Notes on the Empress Augusta River Expedition.] *Bot. Jahrb.* 55 (Beiheft): 33-44. 1919.—See Bot. Absts. 6, Entry 1508.

803. MARTI, F. Verbauungen, Aufforstungen und Berasungen in den Einzugsgebieten der Wildbäche. [Damming, afforesting, and sodding the watersheds of the forest lakes.] *Schweiz. Zeitschr. Forstw.* 71: 230-244. 1920.—The forest and alpine lakes are a heritage of nature, and the forest life and development often depend on their preservation. Where the watersheds are barren rock or open slopes, the run-off is so rapid that the precipitation causes sudden rising of the lakes and overflowing with resultant damage to the lower valleys. Between the timber line and snow line there is usually an area of barren slopes from 1,000-1,500 m. beginning at an elevation of 1,600-1,800 m. The forests have extended to high altitudes, but the natural forest conditions must not be interfered with, or the timber line will be brought to lower levels. The principal species are the larch and cembra pine. In some localities, large areas of young growth are dying, although the underplanted spruce remains thrifty. Afforestation may be effective in some regions, depending on temperature and precipitation. Wide variations of precipitation occur on different slopes due to direction of storm movements and ridges. Where afforestation is not practicable, the areas should be sown to grass to prevent erosion. In some regions it is necessary to build terraces. Where rock is available it affords the best material for construction, but sod and a mixture of dirt and gravel may also be used.—J. V. Hofmann.

804. McLEAN, R. C. Studies in the ecology of tropical rain forests, with special reference to the forests of South Brazil. *Jour. Ecol.* 7: 121-172. 10 fig. 1919.—See Bot. Absts. 6, Entry 1500.

805. MILL, R. H. Woods and water supply. [Rev. of: HENRY, AUGUSTINE. *Forests, woods and trees in relation to hygiene*. XII + 314 p. Constable and Co.: London, 1919.] *Nature* 105: 158-159. 1920.—Greater part of volume is devoted to afforestation of water catchment areas. Reviewer agrees with author that the effect of afforestation in increasing the general rainfall is probably negligible in the British Isles.—O. A. Stevens.

806. MOREL, C. *Activité de l'assimilation chlorophyllienne chez le pin sylvestre, quantité d'eau nécessaire à la végétation d'une forêt de cette essence.* [Activity of chlorophyll assimilation and water requirements of Scotch pine.] *Rev. Eaux et Forêts* 58: 163-166. 1920.—Dry wood contains about 50 per cent carbon, and air about 0.3 per cent carbon dioxide. For a forest of Scotch pine to produce 5 cubic meters of wood per hectare per year, it is therefore necessary for the chlorophyll in the leaves to come into contact with 7,715,000 cubic meters of air. This means that during the 1,200 hours of insolation in the period of vegetative activity between May 1 and September 1, the leaves must absorb every second a volume of air equal to nearly one-fifth of their own volume; or, in other words, that the openings in the chlorophyll tissues must fill and empty themselves of air at least every two seconds. The pine leaf is thus far from being an inert organ. Assuming that each cubic meter of air expired contains on the average 20 grams of water vapor, which is certainly a maximum, the leaves would transpire each year 154,000 kilograms of water per hectare. Assuming further that evaporation from the leaves and other parts of the tree is twice the transpiration, the total annual water requirement of the forest is approximately 500,000 kilograms per hectare. This is equivalent to a water blanket over the surface of the soil 5 centimeters in depth. In spite of so small a water requirement, Scotch pine forests sometimes fail to produce a normal amount of wood because they are in general relegated to soils which do not retain capillary water well, because the humus which they produce improves only slightly the physical properties of the soil, because the root hairs occupy a comparatively thin layer of soil, and because the tree itself has but little reserve capacity. While Scotch pine seldom dies of drought, a soil which is desiccated during the growing season may thus result in reduced wood production. Conditions may be considerably improved by underplanting open stands with such species as beech or hornbeam, which produce a heavy leaf litter.—*S. T. Dana.*

807. MORVILLEZ, F. *L'appareil libéroligneux foliaire des Bétulacées, Corylacées et Castanéacées.* [The vascular anatomy of the leaves of the Betulaceae, Corylaceae, and Castaneaceae.] *Compt. Rend. Acad. Sci. Paris* 170: 674-677. 12 fig. 1920.—See Bot. Absts. 6, Entry 1903.

808. OECHSLIN, M. *Felssturz im Bannwald Altdorf (Uri).* [Rock avalanche in the forest of Baun, Altdorf.] *Schweiz. Zeitschr. Forstw.* 71: 150-154. 1 pl. 1920.—On January 4, 1920, a slide occurred near Moos Lake at an elevation of about 1050 m. The slide started at one point and divided into two paths through the forest. Strips 150 to 200 m. wide were torn out, and all of the timber and rocks were piled at the base. Approximately 10 ha. (about 25 acres) of forest were completely destroyed, including about 2,000 cubic m. of timber, three-fourths of which was buried among the debris. The slide occurred on a 35° to 40° slope. Slides in this region are caused by the porous condition of the soil and rock at the surface, which permits all surface water to penetrate to the impervious bed-rock. Very few springs occur, and those that do are intermittent except at the base of the hills. This condition causes a wet layer to form at the surface of the bed-rock, and during periods of wet snow or heavy rainfall avalanches result.—*J. V. Hofmann.*

809. OGURA, YUDSURU. *Some observations on the growth in thickness in trees, especially with regard to that of Cryptomeria japonica.* *Bot. Mag. Tokyo* 34: 81-109. 1920.—See Bot. Absts. 7, Entry 1068.

810. OLMSTED, FREDRICK E. *National forest policies: a critical review of the several plans.* *Jour. Forestry* 18: 598-609. 1920.—An analysis is presented of the major features of the national forest programs proposed by the United States Forest Service, the American Paper and Pulp Association, the National Lumber Manufacturers' Association, and the Society of American Foresters. Of these, the last is preferred as it provides for direct national control, and is far better than any state administration because of freedom from politics, firmness of purpose, and efficiency.—*E. N. Munnis.*

811. PATTON, R. T. On the growth, treatment and structure of some common hardwoods. *Proc. Roy. Soc. Victoria* 31 (N. S.): 394-411. *Pl.* 21, 7 fig. 1919.—The forest management, the seasoning, and some notes on the structure of mountain ash, *Eucalyptus regnans*, are discussed. At present there are no managed forests of known age, so that methods of constructing yield tables must be worked out. SCHLICH's method of selecting an average tree per plot is criticized. An average of as many typical trees as possible is preferred. Difficulty is experienced in counting rings after ninety years. Some data are also given on blackwood, *Acacia melanoxylon*. Growth curves of the two Australian species are compared with curves for cluster pine from Portugal and for spruce. Rapid growth is apparent from the first, but the eucalypt appears to have an anomalous growth curve. No evidence for the reputed slow growth of blackwood was found. Good cabinet timber could be grown in forty years. Doubt was expressed concerning the statement that mountain ash will grow an average 30-inch butt in 40 years; also concerning current height growth figures for eucalypts. The tallest seen by the writer were 261 and 249 feet, respectively. There is an official record of 326 feet. In the yield curves, relations were established between diameter and height, in order to get a workable relation between height and age. Taper in mountain ash was found to be 0.36 inch of the circumference per foot of ascent. Thirty-nine to forty-one trees per acre were found; 50 per acre were advocated, and spacing is as discussed. Seeding 10,000 to 12,000 to the acre was considered about satisfactory. A full and well-formed crown was the end in view.—Natural seasoning conditions are so favorable that doubt is expressed as to the need for kiln drying on a large scale. The fallacy of steaming "to open the pores" is discussed. A test of the effect of steaming on seasoning is given. Matched pieces lost moisture at the same rate, but after three months the steamed pieces began to shrink more than the unsteamed. This was explained as due to a slight breaking down of the wood structure. It was concluded that there is no justification for this practice or for that of end-stacking. A free supply of air on all sides of the material is advocated, and the drying of different surfaces is discussed. The possibility of determining moisture content by measuring electrical resistance is mentioned.—The simple structure of mountain ash with its evenly distributed large pores (average radial diameter, 0.253 mm.) is pointed out, and tests on the length of these are described. The fibers averaged about 1 mm. in length. Sapling fibers were slightly longer than those formed later. The uniseriate rays were very numerous and said to contain nuclei in the cells at the center of trees over 100 years old. No starch was found. The fibers at the center were imperfectly lignified. It is thought that good forestry would reduce the amount of immature wood formed. Tyloses were often associated with the nuclei. In *E. obliqua* tyloses were reported "right up against the cambium." Mountain ash hardens greatly when dried. Its tannin content is objectionable for its use as pulp.—*Eloise Gerry.*

812. PILlichODY, A. Aus dem Grossen Risouxforst. [The great forest of Risoux.] *Schweiz. Zeitschr. Forstw.* 71: 177-179. 1 pl. 1920.—The Risoux Forest is a large unbroken tract of virgin forest along the French border, stretching over 15 kilometers. It contains 2277 ha. (about 5,690 acres) and is one of the few unbroken tracts of forest land. No utilization of timber from this tract was made until 1904; a road was then built through it, which made possible the use of firewood and poles. A stand of 316 m³. per ha. covers the area, consisting of about 80 per cent spruce, 10 per cent fir, and 10 per cent beech. The forest is from 300 to 350 years old. Where old trees have died or fallen, groups of young trees have sprung up. Such groups usually are suppressed and do not survive. Beech forms an understory and also, by shading, serves in clearing the conifer trunks of small side branches. Diameter classes were taken in 1911 which showed the following percentages in each class: 16-18 cm., 12 per cent; 30-48 cm., 44 per cent; 50 cm. and over, 44 per cent.—*J. V. Hofmann.*

813. PILlichODY, A. Verschiedenes Verhalten gegen Windströmung. [Varying reaction to wind pressure.] *Schweiz. Zeitschr. Forst.* 71: 154-155. 1 pl. 1920.—Canadian popple and Italian popple were planted at Wallis where they were exposed to severe winds consistently from one direction. At 30 years of age Canadian popple showed a stem decidedly inclined in the direction away from that of the prevailing wind. It produced a good growth and devel-

oped a strong, stocky stem with many branches. The Italian popple produced a straight, upright, slender stem, and few branches, although its growth almost equalled the Canadian.—*J. V. Hofmann.*

814. PRITZEL, E. *Die Grettstadter Wiesen* [Germany]. [The meadows of Grettstadt.] Bot. Jahrb. 55 (Beiheft): 83-112. 1 map. 1919.—See Bot. Absts. 6, Entry 1510.

815. PROSCHOWSKY, A. R. *Les Conifères dans les terres calcires sur la Côte-d'Azur.* [Conifers in calcareous soils at Côte-d'Azur.] Rev. Hortic. [Paris] 92: 75. 1920.—See Bot. Absts. 6, Entry 1869.

816. RAMALEY, FRANCIS. *Subalpine lake-shore vegetation in north-central Colorado.* Amer. Jour. Bot. 7: 57-74. 6 fig. 1920.—See Bot. Absts. 6, Entry 1511.

817. RAMIRÉZ, GONZALO. *Una neuva planta hulifera.* [A new rubber plant.] Rev. Agric. [Mexico] 5: 118-119. 1919.—Gives a description of a plant (*Cryptostegia madagascariensis*) from Lower California which gives promise as a source of rubber.—*John A. Stevenson.*

818. RAND, R. F. *Wayfaring notes from Great Namaqualand* [Southwest Africa]. Jour. Botany 58: 53-55. 1920.—See Bot. Absts. 6, Entry 1512.

819. REGAN, W. S. *The destruction of Ribes by chemical means.* Amer. Plant Pest Committee Bull. 4: 12. 1920.

820. RIDSDALE, P. S. *The Memorial Trees of the United States.* Garden Mag. 30: 177-180. 2 fig. 1920.—See Bot. Absts. 6, Entry 1870.

821. ROBINSON, R. G. *Phases of forestry practice.* New Zealand Jour. Agric. 20: 36-48. 1920.—Many failures in afforestation are believed to be due to improper varieties, or unwise mixtures of varieties. The importance of good seed is shown by experimental tests. Planting distances should vary according to species and soil. There is danger in planting too close as well as in planting too far apart. It has been found that careful thinning will pay for the labor involved. Plantations of *Pinus insignis* have yielded £100 per acre, and should yield much greater returns if properly handled. Natural regeneration of pine and gum forests is desirable and practical in some instances. Softwoods, hardwoods, and medium woods best suited to New Zealand conditions are listed.—*N. J. Giddings.*

822. RUSSELL, G. A. *A machine for trimming camphor trees.* U. S. Dept. Agric. Dept. Circ. 78: 3-8. 4 fig. 1920.—See Bot. Absts. 6, Entry 1989.

823. SCHLUPF, W. F. *Rodent injury to trees, cause, prevention and repair.* Jour. Dept. Agric. Union of South Africa 1: 445-455. 1920.

824. SIM, T. R. *Cultivated trees, I.* South African Jour. Indust. 3: 783-793. 1920.—No species indigenous to South Africa can be recommended for commercial culture, since in every case there are exotic species commercially more profitable. Commercial tree culture can be most profitably undertaken in the natural forest or grass areas of the eastern slope; i.e., in the Knysna Conservancy, Kaffraria, Transkei, Griqual and East, Natal, Swaziland, Transvaal, Bush Veld, and Transvaal Low Veld. In all these areas summer rainfall predominates, except in the Knysna Conservancy, where rains are more or less regular.—*E. M. Doidge.*

825. STRUBY, A. *Wald und Weide.* [Forest and meadow.] Schweiz. Zeitschr. Forstw. 71: 199-202. 1920.—From "Schweiz. Alpwirtschaftlichen Monatsblätter."—The value of alpine meadows is emphasized and their value compared with that of woodlands. The most productive portions are found among scattered stands of trees, and this feature should be considered in utilizing these meadows. Areas too rough or steep to be used for meadow

should be planted to forest, and strips of trees should be placed on ridges and at places of advantage in sheltering the meadows and the grazing animals. The development of forest and meadow should go forward together for the greatest returns from the area.—*J. V. Hofmann.*

826. TREVOR, C. G. Yield tables for single trees of deodar, kail, chil, spruce and silver fir. *Indian Forester* 46: 439-451. 1920.—Results obtained through 20 years of work are given in the form of tables for the above species. The data are compiled in cubic feet for diameter and age groups and show that the current annual increment culminates around 120 years with diameters of 20-24 inches. Spruce and silver fir have the highest values, with 3.60 per cent at 105 to 115 years; and kail has the lowest, with 1.75 per cent at 75 years. Three site qualities are recognized which are based on total height of the trees.—*E. N. Munns.*

827. UNWIN, A. N. African softwoods for pulp production. *Nature* 105: 599. 1920.—The following might be of use: *Eriodendron anfractuosum*, *E. orientale*, *Bombax buonopozense*, *Triplochiton Johnsonii* and *T. nigericum* (wood similar to spruce, fibers long, reproduction easy and growth rapid), *Sterculi Barterii* (growth very rapid), *S. tragacantha*, *Terminalia superba*, *Alstonia congensis*, *Ricindendron Hendelotii*, *Pycanthus kombo*, *Musanga Smithii*. The baobab, *Andansonia digitata*, has been suggested as suitable, but is usually scattered and remote from navigable waterways.—*O. A. Stevens.*

828. WATSON, RUSSELL. Summer planting of white pine on the Michigan state forests. *Jour. Forestry* 18: 623-624. 1920.—Planting of *P. strobus* seedlings in Michigan was carried on weekly from June to September, and the results appear to show that fall planting can profitably be begun in August, and that the losses from summer planting were not as great as might be expected.—*E. N. Munns.*

829. WATT, A. S. On the causes of failure of natural regeneration in British oakwoods. *Jour. Ecol.* 7: 173-203. 1919.—See Bot. Absts. 6, Entry 1501.

830. WEIDMAN, ROBERT H. A study of windfall loss of western yellow pine in selection cuttings fifteen to thirty years old. *Jour. Forestry* 18: 616-622. 1920.—On government sales of timber in Oregon, a heavy windfall loss is experienced in *P. ponderosa* stands the first few years after cutting. The winds causing such loss are quite common in the region, and fear of continued losses was felt. Observations on older cuttings of private operators who cut their holdings in a manner similar to that practiced on timber sales, show that the heavy losses, both in actual number and in volume, occur only in the first decades following the opening in the stand, the decrease in numbers being more prominent than in volume because of the large trees involved in the later windthrows, which, however, are not left under present marking practice. The loss is that of the weakest trees and is heaviest in the early stage, for after exposure the trees strengthen their root system. The study shows that the subsequent losses on sales should be slight.—*E. N. Munns.*

831. WEISS, HOWARD F. Relation of research to forest management. *Jour. Forestry* 18: 590-597. 1920.—Attention of research workers in utilization and properties of woods might better be concentrated on the species of rapid growth than on those of slow growth, even though the slower-growing woods are at present of slightly higher value. Forest management of the future will be intimately tied up with the relation existing between yields and the cost of production, which invariably favors the faster-growing species. Research in products has already resulted in increased revenues from lands, and similar work should stabilize industries which are dependent on fluctuating markets.—*E. N. Munns.*

832. WILSON, E. H. The romance of our trees. VII. The beeches. *Garden Mag.* 31: 115-119. 4 fig. 1920.—See Bot. Absts. 6, Entry 1471.

833. WILSON, E. H. The romance of our trees. IX. Whence came the common fruits. *Garden Mag.* 31: 259-263. 1920.—See Bot. Absts. 6, Entry 1472.

834. WILSON, E. H. The romance of our trees. X. The Lombardy poplar and the Babylon willow. *Garden Mag.* 31: 317-320. 5 fig. 1920.—See Bot. Absts. 6, Entry 1473.

835. WILSON, E. H. The cedars of Lebanon. *Garden Mag.* 30: 178-183. 4 fig. 1919.—See Bot. Absts. 6, Entry 1876.

836. WILSON, E. H. The romance of our trees. II, The Ginko. *Garden Mag.* 30: 144-148. 7 fig. 1919.—See Bot. Absts. 6, Entry 1877.

837. WIMBUSH, A. Artificial regeneration of teak by sowing. *Indian Forester* 46: 488-492. Pl. 21. 1920.—Experience gained in the past work shows that early felling of the cover crop is necessary to allow time for drying before burning, that seed should be carefully selected and a nursery established on the ground, and that the grass should be cut before seeding takes place.—E. N. Munns.

838. ZON, R. Effect of forests upon streamflow. [Rev. of: ENGLER, ARNOLD. *Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer*. Mittell. Schweiz. Zentralanst. Forst. Versuchsw. Zürich, 1919.] *Jour. Forestry* 18: 625-633. 1920.—Twenty-years' record of the Emmental Experiment Station in Switzerland and ten-years' of the Wagon Wheel Gap Station in Colorado have been completed, and so far the results are directly comparable. In Switzerland it has been found that the annual run-off from the forested and non-forested areas is approximately the same, the chief difference in the disappearance of water being due to evaporation from the surface and the transpiration from the cover. Forest cover has a beneficial effect upon the régime of streams; and landslides, which occur more or less regularly on open lands, rarely occur in forested basins. Forests, it is shown, have a beneficial effect on the discharge and the amount of material in the water, and that floods are less pronounced, though previous climatic conditions have a marked effect upon the run-off and absorption in the soil. The chief effect of the forest appears to be upon the permeability of the soil and consequently upon water absorption. The moisture content of the soil is higher than in the open because of ground water, drouth in the open depleting this reservoir, which is maintained by the forest cover.—E. N. Munns.

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

839. ÅKERMAN, Å. Jakttagelser rörande stråfusarios på varvete sommaren 1917. [Observations on a Fusarium disease of spring wheat.] *Sver. Utsädesfören. Tidskr.* 28: 82-89. 1918.

840. ALLEN, E. J., AND E. W. SEXTON. Eye-colour in *Gammarus*. *Jour. Genetics* 9: 347-366. 1 pl., 1 diagram. Mar., 1920.—In *Gammarus chevreuxi* the eye is normally reniform and pigmented black. In the second laboratory generation a red-eyed mutant appeared, Red-eye is a simple Mendelian recessive to black, the F_2 ratio being 3:1. In a second mutation, called albino eye, the eye not only lacks pigment but is "imperfect;" it is small and variable in size and shape, and has few ommatidia, which are irregularly distributed, and has unevenly distributed white pigment (distribution regular in normal eye). Albino eye is a simple recessive to color. Albino-eyed specimens all carry a factor for color—some for black, some for red, some for both. The white eye pigment in both colored and albino eyes is quite variable in amount. Absence of this white pigment occurs both in pigmented- and albino-eyed stock. "No-white" is a simple recessive to pigment. This is a not uncommon mutation appearing in some families of all the author's stocks and was seen in another species of wild *Gammarus*. This mutation begins in at least two different ways: (a) it may appear suddenly either with one eye or with both eyes affected, or (b) it may develop gradually; e.g., parents with thin reticulation giving some young with thin reticulation, and some "no-white." "In the albino-eyed stocks the white extra-retinal pigment shows a tendency to break up, and

portions of it become detached from the eye." These white spots may occur in any of several positions on the head and first body segment. Spots have occurred in all the experimental stocks, but seem to run in particular families; they are most frequent in albino stock and frequent in red, heterozygous for albino. "The spots appeared almost simultaneously in our different stocks." The authors present briefly a considerable number of data involving many individual matings, from many of which 300 or more young were obtained. Authors conclude that "the inheritance of spots did not follow the simple Mendelian law. The spotted condition did not behave either as a pure dominant or a pure recessive. Spotted animals mated together always gave both spotted and unspotted offspring. One point, however, came out clearly, namely, that albino and coloured strains carrying albino gave a much larger percentage of spotted young than do pure coloured strains. There is a possibility that the inheritance of spots follows some complicated Mendelian law. . . . The Mendelian ratios 3:1, 9:7, 15:1 frequently occur in some of the best cases we have, where figures are large, but it is hard to find a consistent theory."—This study, parts of which have been set forth in earlier papers, probably represents the first Mendelian analysis of hereditary characters in Crustacea.—A. M. Banta.

841. ALVERDES, FRIEDRICH. Über das Manifestwerden der vererbten Anlage einer Abnormität. [On the manifestation of the hereditary factor of an abnormality.] Biol. Zentralbl. 40: 473-480. Oct., 1920.

842. ANONYMOUS. British cytology. [Rev. of: DONCASTER, L. An introduction to the study of cytology. XIV + 280 p., 24 pl., 31 fig. Cambridge University Press: Cambridge, England. 1920.] Nature 105: 190-191. 1920.

843. ANONYMOUS. Rapid *Cyclamen* culture and raising hybrids. Florists' Exch. 50: 1070. Nov. 20, 1920.—Suggestions on *Cyclamen* culture and possibilities of hybridization between different species and related genera, such as *Dodecatheon*. Greenhouse *Cyclamen* originated from *C. persicum* and *C. laciniatum*, the latter contributing the fringe types.—Orland E. White.

844. ANONYMOUS. Scottish station for research in plant breeding. Pharm. Jour. 103: 191. 1919.—By private subscription, supplemented by government funds, money is being accumulated for the founding of the above-named institute. It is hoped that part of the work of the station will result in the introduction of improved agricultural varieties of plants such as will help in solving problems of food production and of rural employment. In developing the station Scotland is keeping abreast of England and Wales where provision is being made for botanical research under similar conditions.—Wilber Brotherton, Jr.

845. ANONYMOUS. The progress of genetical research. Gard. Chron. 68: 175. Oct. 9, 1920.—Editorial comment and partial review of Miss SAUNDER's presidential address to the Botanical Section of the British Association. Notes increasing complexity of Mendelian phenomena. Some plant characters are expression of a single factor, while others depend on simultaneous presence of several factors. Hairiness in *Lychnis vespertina* depends on one factor. Hairy \times glabra gives hairy in F_1 and 3 hairy: 1 glabra in F_2 . In stocks, SAUNDERS has shown hairiness depends on presence of four factors, the absence of any one of these giving glabrous plants. Ligules on oats due to four or five factors, the presence of any one of which gives rise to ligule. HERIBERT-NILSSON shows *specific* or *species* characters are not exempt from Mendelian law. In *Salix* (willows) those characters regarded by systematists as of specific value depend on normal-acting Mendelian factors. Specific-character factors more general in effect on plant structure than varietal-character factors. Former, unlike latter, may affect many or all parts of plant, thus bringing about striking peculiarities in general appearance of plant. These facts may throw light on why some species, outwardly very distinct, are easily crossed with each other, while others, to the eye much more nearly alike, give no results when crossed together. Suggests that apparently wide differences between species in some cases may be due to relatively few factor differences. Comments on GREG-

ORY's work on giant forms of *Primula* and on SAUNDERS's studies on linkage in stocks. Horticulturists generally should welcome suggestion of Miss SAUNDERS, that there should be more organized coöperation between all those sections of investigators and breeders interested in laws of heredity and improvement in plants and animals.—*Orland E. White.*

846. ANONYMOUS. On the selection of *Hevea brasiliensis*. Kew Bull. 1920: 113-119. 1920.—Brief account drawn from Dutch sources. Improvement in rubber production may be effected by (1) generative selection, isolation of high-yielding strains by seed selection, and by (2) vegetative selection, multiplication of high yielders by grafting, budding, and cuttings. Under (1) establishment of isolated seed nurseries made up of two high yielders propagated by grafting is advocated. This method should be continued through successive generations in order to isolate high-yielding strains. Artificial pollination is practicable, and methods are described. *Hevea* appears normally to be self-sterile. Under (2) methods of grafting and budding and of striking cuttings and securing good stock for cuttings are described. Multiplication by cuttings is favored. In selection of trees high and constant yield of latex is chief desideratum, but state of health and hereditary qualities are also considered. Introduction and trial of new types and species of *Hevea* may result in further improvement.—*R. E. Clausen.*

847. ANONYMOUS. Hybrids of *Gladiolus primulinus*. Gard. Chron. 68: 105. Aug. 28, 1920.—Most hybrids of *G. primulinus* exhibit marked likeness to the same in form and elegance but show considerable color variation.—*J. Marion Shull.*

848. ANONYMOUS. A mule in the vegetable kingdom. Tropic. Life 16: 139. 1920.—According to the London correspondent of the North Queensland Register, MR. F. J. MOORE, of Lion Creek in the Rockhampton District of Queensland, reports an apparent natural hybrid between banana and paw-paw. A clump of bananas growing in close proximity to a small paw-paw tree produced a bunch of fruit which looked like small plantains, but on being opened they were found to contain seeds resembling paw-paw seeds.—*H. N. Vinall.*

849. ANONYMOUS. The genetics of strawberries. [Rev. of: RICHARDSON, C. W. Some notes on *Fragaria*. Jour. Genetics 10: 39-46. 2 fig. July, 1920.] Gard. Chron. 50: 211. Oct. 30, 1920.

850. ANONYMOUS. The structure of the nucleus. [Rev. of: AGAR, W. E. Cytology: with special reference to the metazoan nucleus. XII + 224 p. Macmillan & Co.: London, 1920.] Nature 105: 482-483. 1920.

851. ARBER, A. The "Law of loss" in evolution. Proc. Linnean Soc. London 1919: 70-78. 1919.—Law of loss means the "general rule that a structure or organ once lost in the course of phylogeny can never be regained; if the organism subsequently has occasion to replace it, it cannot be reproduced, but must be constructed afresh in some different mode." Examples cited are loss of roots in *Ceratophyllum* and *Utricularia* and substitution of special subterranean shoots; failure of ciliated sperms to reappear in aquatic Angiosperms with submerged fertilization; replacement of perianth in *Najas* with cupular outgrowth of receptacles; loss of opposable thumb or great toe in tree kangaroo, with substitution of enlargement of claws; and others from plants and animals. Operation of law of loss may be favorable "by closing well-worn paths and thus indirectly encouraging the opening of fresh routes."—*A. Franklin Shull.*

852. ARMBRUSTER, LUDWIG. Messbare phaenotypische und genotypische Instinktveränderungen. Bienen und Wespengehirne, neu verglichen und als Mass benutzt in Fragen der Stammes- und Staatengeschichte sowie Vererbung und Genogenese. Nebst Anhang über *Nomada*. [Measurable phenotypic and genotypic changes of instinct. Bee and wasp brains compared anew and used as a measure in questions of race and state history as well as heredity and genogenesis, with an appendix concerning *Nomada*.] Archiv Bienenkunde 1: 1-40. 5 pl.,

8 fig. 1919.—Author reviews and continues work of late von ALTEN on fungiform bodies, central nervous structures of Hymenopterous brain. From transverse sections of brain von ALTEN made the following measurements: Total diameter of fungiform bodies (a), height of fungiform bodies (h), total diameter of protocerebral lobes (b), and total diameter of fibrous part of optic lobes (c); b and c are relatively constant and serve as standards in brain index devised by author, $a/b + a/c + h/b + h/c$. Comparison of brain indices of sexes and casts of various aculeate species shows that size of fungiform bodies is correlated with degree of development of instincts. In general, solitary species stand below social, and simpler solitary below more complex. Size of insect as whole, or size or shape of head, does not affect index. Species of one and same genus may have rather widely diverse brain indices. Bees with ventral scopa do not stand below those with scopa on legs, but the two groups run parallel. Digger wasps apparently run parallel to solitary bees. Social wasps in every case run parallel to social bees. Among social bees, the bumble bee has much higher index than the honey bee. This is to be expected from fact that latter is far below former in structure, such as length of tongue, and in instincts; for social life is not necessarily an indication of high position in scale of development. Consider termites, for example. Sex dimorphism appears from lowest to highest species, females in general having larger brains. Among social aculeates male brain is the most weakly developed. Of female brains, that of worker is better developed only in ergatotelic honey bee, while in gynaeotelic bumble bees and wasps queen has larger brain. This is correlated with fact that queen honey bee is practically a parasite for life upon worker colony while in gynaeotelic forms queen must found colony. In solitary parasite, *Nomada*, and still more so in social parasite, *Psithyrus*, male possesses the more highly developed brain. In *Nomada*, brain indices of both male and female are very high for parasites, while in *Psithyrus*, index for male corresponds to average brain index of other bumble bees. In parasitic forms, therefore, brain of female tends to retrogress, while that of male remains to show from whence species has diverged. Resemblance of parasite to host is not to be explained by mimicry but by relationship. General subject of genogenesis, which lies at root of species problem, is considered. Males having reduced chromosome number should be especially subject to mutation and yet, in spite of diverse environments, parasitic males have not changed and females have remained parasites. Difference in feeding causes phenotypic differences of form and instinct between queens and workers. Question is raised as to how this phenotypic difference became genotypic, as in transformation of phenotypically parasitic queen of *Apis* or *Bombus* into genotypically parasitic *Psithyrus*.—P. W. Whiting.

853. BALLARD, W. R. Notes on geranium breeding. Amer. Soc. Hort. Sci. 1918: 62-65. 1918.—Recounts breeding work done to secure disease resistance. Because of hybrid nature of most varieties considerable segregation occurs in F_1 generation: Singles \times singles gave 84 singles and 6 doubles; singles \times doubles gave 59 singles and 74 doubles; doubles \times doubles gave 40 singles and 30 doubles. Correlation indicated between presence of nectar tubes and singleness of flower. Little success attended effort to hybridize different species; Lady Washington type will combine with some of the scented-leaved types, and the zonal group will hybridize with the ivy-leaved section but not with either the show or scented-leaved groups. —J. Marion Shull.

854. BALLY, WALTER. Die Godronschen Bastarde zwischen Aegilops- und Triticumarten. Vererbung und Zytologie. [The Godronian hybrids between species of Aegilops and Triticum. Heredity and cytology.] Zeitschr. indukt. Abstamm. Vererb. 20: 177-240. 4 fig. Feb., 1919.

855. BARCLAY, J. R. Scottish pure-bred live stock. I. Aberdeen-Angus cattle. Scot. Jour. Agric. 2: 456-464. 4 pl. 1919.—A brief account of the early history of the Aberdeen-Angus cattle, of the present characteristics of the breed, and of the success attained in all parts of the world in competition with other beef breeds.—Sewall Wright.

856. BAYON, H. **Racial and sexual differences in the appendix vermiformis.** Anat. Rec. 19: 241-249. Sept. 20, 1920.—Statistics based on surgical records distinctly indicate a greater frequency of appendicitis in the white race than in the negro, but the records are shown to be subject to error in favor of the white frequency. Therefore, a comparative study of structure of the appendix was undertaken to determine if there are racial and sexual differences, with special reference to "susceptibility to inflammation." One hundred appendices, recently removed, many for other causes than appendicitis, were examined as to both gross and microscopic characters. The following results were obtained:—(1) "The musculature of the white appendix . . . seemed slightly stronger than that of the negro;" (2) the white appendix on the average "is shorter and wider;" (3) is "richer in crypts;" and (4) is "rich in lymphocytes and poor in vascularity," while the negro is exactly the reverse. Considered in relation to "other diseases of the lymphatic system," these findings "seem to prove that the white race is more subject to lymphocytic stasis than the negro."—As to sexual differences, it was found that the male appendix is "longer and wider than the female" and the latter is richer in fat, conforming in these respects with prevailing sex differences.—*H. J. Banker.*

857. BLAKESLEE, A. F. **Sexual differentiation in the bread molds.** Proc. Soc. Exp. Biol. Med. 16: 131. 1919.—Primitive sexual forms are hermaphroditic, both the gametes, and the plants themselves, differing in size. Interaction of two sexual races, regardless of species, is necessary for production of sexual spores or "imperfect hybridization."—Different races display variations in sexual vigor. Some seem neutral; hermaphrodites sometimes produce races showing hermaphroditic, female, male, or neutral tendencies.—*Andrew I. Dawson.*

858. BLAKESLEE, ALBERT F., JOHN BELLING, AND M. E. FARNHAM. **Chromosomal duplication and Mendelian phenomena in *Datura* mutants.** Science 52: 388-390. Oct. 22, 1920.—The authors have begun a study of the relationship between the cytological condition and the phenomena of mutation and Mendelian inheritance. *Datura Stramonium*, the Jimson weed, upon which they are working, has normally 24 chromosomes in diploid and 12 in haploid. 12 recurrent mutants have 25 in diploid. The extra chromosome is presumably determined by the duplication of a particular chromosome which has been identified as the one carrying the gene for a particular Mendelian character. Duplication may extend to all of the chromosomes producing tetraploid mutants in which the independent assortment of the chromosomes in the homologous sets is found to be the rule.—*Helen Bergfried.*

859. BLARINGHEM, L. **Hérédité et nature de la pélorie de *Digitalis purpurea* L.** [Heredity and nature of the peloria of *Digitalis purpurea* L.] Compt. Rend. Acad. Sci. 171: 252-254. July, 1920. Cross-fertilization of a plant with regular axial peloria, probably recessive as to flower color, with a wild purple-flowered *Digitalis purpurea* were made by the author. From the results of this experiment the conclusion is reached that the peloria of this species is an extreme case of regular hereditary fasciation; when crossed with wild *Digitalis purpurea* the normal cluster form is dominant over the fasciation, with partial, graduated reversion in progeny of the second and third generations. Individual plants or flowers show partial sterility.—*Edith K. Cash.*

860. BLARINGHEM, L. **Variations florales chez la Grande Marguerite (*Leucanthemum vulgare*, Lamarck).** [Floral variations in the large daisy.] Compt. Rend. Acad. Sci. Paris 169: 193-195. 1919.—Author calls attention to tendency of this daisy (*Chrysanthemum Leucanthemum* L.) to develop vigorous colonies on recently cleared or exposed land. Time of colony formation favors variation and author reports on group of more than a thousand plants that grew on site of drained pond. Heights of plants ranged from 80-150 cm. while same species in suburbs of Paris ranged from 40-70 cm. In colony were 5 fasciated plants. A single ligulate floret was found metamorphosed into tubular one. Counts on 100 heads for ligule number gave modes at 25 and 33 while in case of 9-year-old culture of

same species at another place there was a single mode at 21 ligules. Numerous foliage variations observed in the drained-pond colony and examination of achenes from ligulate flowers of 25 individuals showed that two had the well-developed crown or pappus characteristic of other species of the genus, two had less-developed pappus, while 21 had naked fruits typical of *L. vulgare* Lam.—James P. Kelly.

861. BLARINGHEM, L. Production par traumatisme d'une forme nouvelle de Mais à caryopses multiples, *Zea Mays* var. *polysperma*. [The traumatic origin of a new form of maize with multiple fruits, *Zea Mays* var. *polysperma*.] Compt. Rend. Acad. Sci. Paris 170: 677-679. 1920.—Hereditary line of maize with a varying percentage of double and sometimes triple grains (caryopses) has been isolated from the author's original teratological cultures in which the main stalk of the plant had been injured. A description of this new strain, called *Z. Mays* var. *polysperma*, is given. A correlation between the double grains on the ear and a corresponding union of the spikelets on the staminate inflorescence was observed.—Isolated in 1907, this strain proved to be exceedingly variable in the number of plants which bore ears with double grains. After five years of selection, the author reports that he has fixed the strain to some extent. His data show approximately fifty per cent of plants with double grains in 1919. At the same time the number of double grains on the ear has increased from 5 per cent to 95 per cent.—The author calls this a typical case of a heritable, acquired character.—E. W. Lindstrom.

862. BLARINGHEM, L. Stabilité et fertilité de l'hybride *Geum urbanum* L. \times *G. rivale* L. [Stability and fertility of the hybrid, *Geum urbanum* L. \times *G. rivale* L.] Compt. Rend. Acad. Sci. Paris 170: 1284-1286. May, 1920.

863. BOND, C. J. On certain factors concerned in the production of eye colour in birds. Jour. Genetics 9: 69-81. Dec., 1919.—Eye colors of birds are arranged in a series. At the bottom is "bull" eye, as found in pigeons, which is due to absence of anterior pigment in iris and background of black pigment in the uvea. Next stage is pearl eye of pigeons and "daw" eye of fowls, caused by colorless granules in the iris, which destroy its translucency. In extreme cases this type of eye may be china-white as in the "wall" eye of dogs, horses and pigs. Yellow or "gravel" eyes are due to a network of branching cells crowded with small spherical yellow granules on the anterior surface of the iris. Brown and black eyes are due to brown or black pigment replacing or covering the yellow (giving triplex condition). The ruby eye is produced by yellow pigment in conjunction with the red capillaries, except in the Cayenne Lapwing, where actual reddish pigment granules are found. Some data on inheritance of the types are given. In general they form an epistatic series, with the simplex "bull" eye at the bottom. There are some complications due to secondary sex relations.—Leon J. Cole.

864. BOND, C. J. On the left-sided incidence of the supernumerary digit in heterodactylous fowls. Jour. Genetics 10: 87-91. July, 1920.—Author reports that among 38 heterodactylous (five toes on one foot and four on the other) offspring from various crosses of four-toed and five-toed breeds of fowls, 34 had the extra digit on the left side and only four on the right side. Reports slight indication that this situation is more likely to prevail when the female parent belongs to the five-toed breed. Data of other investigators are discussed and the conclusion reached that in birds "there is a tendency during the early cleavage of the ovum which separates the organism into a right and left half, for the factor or factors which control meristic variation to pass to the left rather than to the right half of the developing zygote."—W. A. Lippincott.

865. BORING, EDWIN G. A priori use of the Gaussian-law. Science 52: 129-130. Aug. 6, 1920.—The author criticizes Mr. MICHAEL's interpretation of Dr. JOHNSTONE's results for twenty counts of bacteria in polluted shell fish. He objects to MICHAEL's factoring of a skew distribution into a Gaussian distribution and a skewing factor on the ground that, in absence of observational proof that the frequencies at hand follow the Gaussian law, this

law is meaningless. He also objects to application of elaborate statistical methods when the number of observed cases is as small as in JOHNSTONE's problem and he suggests that the mode and upper and lower quartiles, as determined directly from the observations, give all the information desired.—*Lowell J. Reed.*

866. BOUVIER, E.-L., AND D'EMMERZ DE CHARMODY. *Mutation d'une Caridine en Ortmannie et observations générales sur les mutations évolutives des Crevettes d'eau douce de la famille de Atyidés.* [Mutation of *Caridina* into *Ortmannia* and general observations on the evolutionary mutations of fresh-water shrimps of the family Atyidae.] *Compt. Rend. Acad. Sci. Paris* 169: 317-321. 1919.—Authors have previously stated that certain shrimps or prawns (family Atyidae) of the Indo-Pacific region give rise by mutations to representatives of previously known species of higher genera. Such changes are cited for the following forms:—*Caridina richiersi* to *Ortmannia edwardsi*; *Ortmannia alluaudi* to *Atya serrata*, *Ortmannia henshawi* to *Atya bisulcata*. The second of these is reported to have been experimentally proven by BORDAGE, the two genera having been obtained from the same clutch of eggs. The first is found experimentally by the writers to occur in a brood reared in an aquarium (8 *Caridina* and 1 *Ortmannia edwardsi*). The species which give rise to the forms unlike themselves are quite variable, but the higher forms (to which the derived forms belong) on the other hand, are remarkably stable. Authors think the results not due to hybridization since they do not find individuals with intermediate generic characters and BORDAGE did not get pairing between the different genera. Results are attributed to evolutionary mutations.—*A. M. Banta.*

867. BROTHERTON, W. E., JR. *The heredity of "Rogue" types in garden peas (Pisum sativum).* *Michigan Acad. Sci. Ann. Rept.* 21: 263-279. *Pl.* 7-13. 1919.—Describes "rogue" type in garden peas, which occurs in varieties with large, wide pods and relatively broad leaves such as Gradus, Duke of Albany, Early Giant and Peter Pan. Rogues differ from type plant of variety in which they arise chiefly in reduced foliage (vetch-like), narrower pods often sickle-shaped or curvature increased, height in general greater, either due to increase in internode number or in internode length; often later-flowering, change from sub-cuneiform seed of type to drum-shaped seeds; rogue seeds average smaller and in green state bitter as compared with sweet type seed. Sterile rogues rarely occur. Usually rogues equal or surpass in productiveness the type. Author mostly worked with rogues from Gradus variety. Per cent of rogues to type in rogue-producing Gradus families was 9.6 (actual figures 5 rogues: 51 type.) Out of 150 Gradus plants selected at random, only one had rogues among progeny. Summarizes data of BATESON and PELLEW and confirms their results. In addition, finds in seedling stage, rogue plants are more variable in regard to ratio of length to breadth of stipules than are type plants. Hybrids (rogue \times type) resemble rogue parent in this respect. Some evidence that rogues crossed with typical plants of non-rogue-throwing varieties in F_2 and following generations show segregation of width of stipule. Rogues not comparable to any existing variety of pea. Observations are similar to those of WHITE as regards rarity of cross-pollination in peas under field conditions. Cites statement of STARR that percentage of crossed Gradus plants under ordinary field conditions during one season was very high.—*Orland E. White.*

868. BURNS, W. *Some aspects of plant genetics.* *Agric. Jour. India* 15: 250-276. 1920.—Author's Presidential Address to the Botany Section of the Seventh Indian Science Congress, Nagpur, 1920. Importance of genetics in college or university curriculum is emphasized, and some pedagogical features of the subject are discussed.—Attention is called to problems of bud variation, seedlessness in fruits, and inheritance of sex in plants, and to the intimate relation of plant genetics to cytology and taxonomy.—Limitations in plant genetics are pointed out, and the present lack of knowledge concerning causes of non-adaptive variations, and of mutations is discussed.—*C. M. Woodworth.*

869. CLAWSON, BENJAMIN JUNIOR. *Varieties of streptococci with special reference to constancy.* *Jour. Infect. Diseases*: 26: 93-116. 1920.—Author sought to discover relation-

ship between classes of streptococci, and their source, habits, pathogenicity, or other characteristics. More than 160 strains were isolated from various sources, pathogenic and non-pathogenic. Cultural characteristics were ascertained from growth on different media, chiefly blood agar, carbohydrates and salicin. Agglutination and complement fixation were applied.—Author concludes that no relationship of source, habitat, or pathogenicity, of the streptococci classes was established; a basis of classification is lacking.—Morphology and carbohydrate fermentation is variable; hemolysis is fairly constant; the hemolytic group is heterogeneous; agglutination shows a high degree of uniformity.—*Andrew I. Dawson.*

870. CLEAVER, S. M. Merino history and merino breeding. 15 × 23 cm., 48 p., 33 fig. S. M. Cleaver: Delaware, Ohio, 1918.—A popular account of the history of Merino sheep breeding in America, with a discussion of the various types which have been developed and the difficulties met in trying to combine all good qualities in one type.—*Sevall Wright.*

871. CORRENS, C. Eine geglückte Verschiebung des Geschlechtsverhältnisses. Botanische Versuche zur Frage nach der Entstehung des Geschlechts. [A successful modification of the sex-ratio. Botanical researches on the origin of sex.] *Natur u. Technik* 2: 65-71. 2 fig. 1920.—Review of sex determination in animals and plants and experiments on the dioecious plant *Melandrium* (*Lychnis*) which show that the staminate plants are heterogamous and the pistillate homogamous. Results agree with those of STRASBURGER and of SHULL in showing excess of pistillate over staminate plants. Deficient amount of pollen applied also resulted in excess of pistillate plants but when large excess of pollen (more than 100 grains per ovule) was applied, so that competition between male- and female-determining gametes took place, there was even greater excess of pistillate plants: 44 to 56 per hundred in the first case and 32 to 68 per hundred in the second. A moderate excess of pollen of 7 grains to 1 ovule gave an intermediate ratio of 40 to 60.—The faster growth of the female-determining pollen tubes was also shown by comparing the seeds from the top half with those from the bottom half of the same capsule. The seeds resulting from the shorter growth of pollen tubes gave 68, and the seeds from the longer growth 56, per cent pistillate plants. In this plant the pollen tubes enter the ovary at a common point and are all free to fertilize the first ovules to be reached. This was tested by pollinating a white-flowered plant with a small quantity of pollen from a red-flowered plant and 24 hours later with pollen from a white-flowered plant: 71 per cent of the crossed, red-flowered plants came from seeds out of the upper third of capsule as compared to 29 per cent from the lower two thirds. Conclusion: Unequal production of heterogametes and unequal rate of growth of pollen tubes modifies sex-ratio in *Melandrium*.—*D. F. Jones.*

872. CRANDALL, C. S. Observations on characters of forms of *Malus*. *Proc. Amer. Soc. Hortic. Sci.* 16 (1919): 131-135. 1920.—The writer bases his observations on 44 standard horticultural varieties and 45 crab forms, and upon 495 parental combinations of them. Most botanical characters of genus are variable. "Petals, 5:" Vary from 4 to 8. Seedlings of variable parent had 10. "Carpels, 2 to 5:" Four out of 32 varieties had constantly 5 carpels; two out of 28 crabs had constantly 5 carpels; in *M. Malus* fl. pl.—81 per cent of fruits varied from 5 to 9 carpels; in *M. spectabilis* 87 per cent had 5 to 12 carpels; in *M. Arnoldiana* 99 per cent and in *M. atrosanguinea* 96 per cent had less than 5 and one of each had 2 carpels. Of 6000 fruits from 23 crab forms, 33.95 per cent varied from 5 carpels. "Ovules, 2 per carpel:" Of 21 standard varieties, only 2 were constant, the variation averaging 8.23 per cent with a maximum of 84.63 per cent. In crabs (25 varieties and species) 12 were constant. In 4 forms, ovules were suppressed, from 1 to 16 less than normal. In remainder there was an excess of ovules from 1 in Yellow Siberian Crab to 300 in *M. spectabilis*. "Calyx lobes persistent or deciduous:" This is a distinctive varietal and specific character. Most cultivated varieties are persistent. Of 41 crab forms, 16 were deciduous, 13, persistent, and in 12, part on each tree were deciduous and part persistent. The writer believes that the instability of this character in most crab forms indicates their hybrid origin.—In F_1 of large leaf × large leaf and small leaf × small leaf (standard varieties), there is a predominance of large-leaved forms, with some small and some intermediate. When large-fruited forms were crossed with

and on small-fruited forms, as *M. floribunda*, *M. Sargentii*, *M. Toringo*, *M. atrosanguinea*, F_1 seedlings resemble small-fruited parent in tree characters, though sometimes in an invigorated form. Some groups of F_1 seedlings in no way resemble parents in vegetative characters.—*C. H. Connors*.

873. CROW, J. W. **Plant breeding from horticultural standpoints.** Ontario Dept. Agric. Ann. Rept. Agric. and Exp. Union 41: 50-52. 1919.—Plant breeding work in the Department of Horticulture of the Ontario Agricultural College is briefly outlined, and the need of further work is emphasized.—*A. N. Wilcox*.

874. CROW, J. W. **Vegetable seed growing and breeding.** Amer. Soc. Hort. Sci. 1918: 88-93. 1918.—The experience in growing and breeding vegetable seeds at the Ontario Agricultural College, and methods used there in growing and curing celery, carrot, parsnip, beet, and onion seeds are briefly outlined.—*A. N. Wilcox*.

875. DALCQ, ALBERT. **Note sur la spermatogénèse de l'Orvet.** [Note on the spermatogenesis of the orvet.] Compt. Rend. Soc. Biol. 83: 1302-1304. Oct., 1920.

876. DANIEL, LUCIEN. **Sur la stabilité et l'hérédité des Crataegomespilus et des Pirocydonia.** [On the stability and heredity of *Crataegomespilus* and of *Pirocydonia*.] Compt. Rend. Acad. Sci. Paris 169: 513-515. 1919.—Daniel has grown 6 forms of chimera, or supposed chimera, none of which bore viable seeds.—(1) The two hawthorn-medlar chimeras of Bronvaux have been grown for over twenty years, and showed no reversions for about fifteen years.—(a) The form most like the medlar has borne twigs of hawthorn, of both chimeras, and twigs resembling medlar. These last, regrafted, gave chimeras again.—(b) The forms most like hawthorn has produced few twigs of hawthorn or of other forms.—(2) The two hawthorn-medlar chimeras of Saujon have been grown for about ten years.—(a) The form nearest the medlar produced some twigs resembling the medlar, but no twigs with spines.—(b) The form nearest the hawthorn bore some twigs of hawthorn, which, however, still showed some characteristics of the chimera.—(3) A pear-quince chimera has been grown for 7 years. It arose from the callus of a graft, is intermediate in its leaves, and can be grafted on either pear or quince. It has formed no flower-buds.—*John Belling*.

877. DANIEL, LUCIEN. **Obtention d'une race nouvelle d'Asphodèle par l'action du climat marin.** [The appearance of a new variety of *Asphodelus* through the action of the marine climate.] Compt. Rend. Acad. Sci. Paris 170: 1332-1333. 1920.

878. DONCASTER, L. **Genetic studies in *Drosophila*.** [Rev. of: MORGAN, T. H., C. B. BRIDGES, AND A. H. STURTEVANT. *Contributions to the genetics of *Drosophila melanogaster**. V + 388 p., 12 p. Carnegie Inst. Washington, Publ. No. 278. Washington, 1919.] Nature 105: 405-406. 1920.

879. DONCASTER, L. **Mendelism.** [Rev. of: PUNNETT, R. C. *Mendelism*. 5th ed. 13 × 19 cm., XV + 219 p., 7 pl., 52 fig. Macmillan and Co.: London, 1919.] Nature 104: 655-656. 1920.—“One of the best introductory treatises on the modern study of genetics. We note with regret that the hypothesis of multiple allelomorphs is nowhere fully discussed.” [See Bot. Abst. 6, Entry 714].—*O. A. Stevens*.

880. DUARTE D'OLIVEIRA, JOSÉ. **Sur la transmission de la fasciation et de la dichotomie a la suite de la greffe de deux vignes portugaises.** [The transmission of fasciation and dichotomous branching through the grafting of two Portuguese varieties of grapes.] Compt. Rend. Acad. Sci. Paris 170: 615-616. 1920.—Scions of a Portuguese variety of grapes, Albino de Sauza, were grafted on stock of another variety, Goncalo Pires. The latter variety is characterized by dichotomous branching and the frequent production of fasciated branches. The former never exhibits these peculiarities. The grafts were made in March. The following June the author noted that the new growth from the scion showed the fasciations and dichotomous branching characteristic of the variety used as the stock and has since continued to exhibit these characteristics.—*C. B. Hutchinson*.

SS1. EAST, E. M. **Population.** *Scientific Monthly* 1920: 603-604. June, 1920.—The author discusses the question of population increase in relation to increase of food. He shows that present figures as to the world's population and food and their rates of increase are entirely in accord with the conclusion of MALTHUS. Discussing the increase by races, he concludes that the white race is increasing much more rapidly than either the yellow or black race. China is practically stationary as to population, India and the South Seas have a slow increase, and Japan has a high rate. The blacks are increasing only in this country, the number of negroes in Africa remaining practically stationary. On the other hand, all the white races except in France are increasing at fairly high rates. Wars, even one as great as the last, seem to have no appreciable effect on the upward march of population.—Turning to the United States, he shows that the law of diminishing returns has begun to apply to agriculture and he calls attention to the fact that future increase in agricultural production is definitely limited. To prevent the population of this country from crowding too closely on the means of subsistence he offers the following remedies: First, a restriction of immigration; second, education; third, equitable readjustment in many of our economic customs; and, last, natural marriage selection—a somewhat increased birth rate in families of high civic value, and among the rank and file a restriction of birth commensurate with family resources.—*Lowell J. Reed.*

SS2. ENGLENDOW, F. L. **Inheritance in barley. I. The lateral florets and the rachilla.** *Jour. Genetics* 10: 93-108. 3 fig. Aug., 1920.—Data are offered showing Mendelian segregation in F_2 generations of crosses between smooth and bristly rachillae. A one-factor difference is found. The problem of the inheritance of lateral florets is discussed and data bearing on its solution presented. Several forms of lateral floret differing either in fertility or shape and size of glume afford to this author instances of multiple allelomorphism. Histological study of the developing lateral florets at different stages is needed to correlate Mendelian characters with histological structures.—*F. P. Bussell.*

SS3. FABER, HAROLD. Foreword by SIR ROBERT GREIG. **Forage crops in Denmark.** ix + 100 p. Longmans, Green & Co.: London, 1920.—See Bot. Abstracts 7, Entry 22.

SS4. GARBER, R. J., and P. J. OLSON. **A study of the relation of some morphological characters to lodging in cereals.** *Jour. Amer. Soc. Agron.* 11: 173-186. 1 pl., 2 fig. May, 1919.—Authors mention the perplexing problem of producing non-lodging small grains possessing high yielding capacity. In 1916 a project was organized to determine whether some simple morphological character is closely related to lodging or non-lodging. Extreme varieties for lodging in wheat, oats and barley were selected and study made of correlation between lodging behavior and average size of culm, average size of vascular bundles, average area of sclerenchyma, thickness of culm wall, length of lignified cells, and thickness of lignified cell wall. None of these characters except thickness of cell wall seems closely related to lodging. Lodging in cereals is dependent on so many factors of unequal value that no one factor seems correlated closely enough with lodging to be of much value as selection index. In oats and barley the average number of vascular bundles was found to be correlated with average diameter of culm.—*Geo. K. York.*

SS5. GATES, R. RUGGLES. **Heredity and eugenics.** *Eugenics Rev.* 11: 193-201; 12: 1-13. 1920.—Summarizes with comments and some discussion recent research as bearing on human heredity under the main subjects of physical characters, mental characters, the limits of heredity and the eugenical, social and world aspects, with a bibliography of fifty numbers.—*H. J. Banker.*

SS6. GEORGESON, C. C. **Summary of the work at the several stations.** Rept. Alaska Agric. Exp. Sta. 1917: 5-33. Pl. 1-2. 1919.—The author describes some new varieties produced by crossing; and presents the results of variety and cultural tests of horticultural and farm crops; and also briefly discusses the value of various ornamental crops for Alaskan conditions.—*H. K. Hayes.*

887. GERSDORFF, C. E. F. **Germination of gladiolus seed.** *Flower Grower* 7: 73. 1920.
 -A table shows the time required for germination, the percentage of germination and the percentage of corms harvested, based on 3261 seeds of various varieties and hybrids. Seeds were previously selected for plumpness. Sixty per cent of the total number of seeds germinated and thirty per cent yielded corms which were harvested. The time required for germination varied from sixteen to eighty-five days. Most of the seeds "should have germinated in thirty-one days."—The method of raising young corms from the seed is described.—A. N. Wilcox.

888. GOWEN, JOHN W. **Self-sterility and cross-sterility in the apple.** *Maine Agric. Exp. Sta. Bull.* 287. 61-88 p. May, 1920.—Many varieties of apples are commonly self-sterile. Results are the same whether stigmas are pollinated from the same flower, a flower from another cluster or from another tree of the same variety. Of 12 varieties, tested, 8 were wholly self-sterile; four—Baldwin, Wealthy, Duchess and Northern Spy—were, in slight degree, self-fertile, Duchess and Northern Spy being doubtfully so. Only 42 of a compiled list of 119 varieties that had been tested are known to have set self-fertilized fruits, and only 15 of these produced fruit in quantity. Varieties do not give the same results in all regions; those self-sterile in one state may be, in some degree, self-fertile in another. In a test of cross-fertility 43 combinations were tried; 20 of these proved compatible and formed fruit. The most successful combinations were Grimes Golden \times Ben Davis, Baldwin \times Golden Russet and Ben Davis \times McIntosh. Of a list of 243 combinations of varieties, made up of tests in several states, 57 are recorded as not producing fruit and 186 as producing fruit. Cross compatibility of varieties can be determined only by trial. Yields of orchards of self-sterile varieties may be increased by introduction of other varieties. The number of good seeds in crossed apples is greater than in those which are selfed.—Causes of self-sterility are external and internal. The chief internal cause is the slowness of growth of the pollen tube in the selfed style as against that in the crossed style. Other internal causes are degenerate pollen and lack of proper development of ovule.—C. S. Crandall.

889. GUYER, M. F., AND E. A. SMITH. **Studies on cytolysins. II. Transmission of induced eye defects.** *Jour. Exp. Zool.* 31: 171-223. 4 pl., 7 fig. Aug. 30, 1920.—Preparation of lens from eyes of rabbits, injected into peritoneal cavity of fowls, leads to formation of specific anti-body. Blood serum from fowls thus treated was injected into veins of pregnant rabbits. In a small proportion of cases, young were born with defective lenses and other eye defects. From young of one such brood five further generations with defective eyes have been propagated. Defects tend to increase rather than decrease in later generations. Defects are transmitted through males as well as females. They behave in some respects as a Mendelian recessive character. Although these six defective generations have all arisen from a single original treated female, full safeguards have been taken against possibility of having bred from a strain which chanced to carry eye defects of this sort, prior to any operative treatment. Also defective young born of an operated mother quite unrelated to the first stock are now being reared for test of heritability of the modifications in independent strain. One case is recorded in which normal appearing offspring of a treated mother gave rise to defective young. This is not in harmony with interpretation of transmission of induced defect as due to direct influence of defective organ upon germ-cells; *i.e.*, inheritance of an acquired character, *sensu stricto*. On the other hand, parallel induction theory is not in keeping with fact that germ-cells of originally-treated mother were in no case affected, but that only those of her offspring which were in utero at time of treatment were affected. Authors are not prepared to adopt definite theoretical interpretation.—F. B. Sumner.

890. HAMMOND, J. **On the relative growth and development of various breeds and crosses of cattle.** *Jour. Agric. Sci.* 10: 233-289. July, 1920.—Data from the Smithfield Club of fat stock exhibits at Islington 1893-1913 were studied to determine the average weights attained by different breeds, dressed weight of carcass, suet fat, gut fat, tongue, head, heart, tripe, hide, blood, intestine and unaccounted for. Similar data are presented for sex, age, and F₁ crosses between breeds. Individual variation is noted. Correlation between weight of one part

and that of another is indicated. Effect of selection over periods 1893-1899, 1900-1906, 1907-1913 and effect of season are discussed.—Steers are shown to weigh about 10 per cent more than heifers at the same age. About 77 per cent of steers' and 81 per cent of heifers' weight at 33 months old, is put on in the first 22 months. Steers have larger proportion of gut fat, head, hide, carcase; heifers a larger proportion of suet fat, tongue, tripe, intestine. Increasing age increases proportion of carcase, suet fat, gut fat; decreases proportion of tongue, head, heart, tripe, hide.—Cross-breeding showed no increase in weight over the heavier parent, where two heavy breeds are crossed, the F_1 is usually heavier than the mean of the two parents; where a heavy and light breed is crossed the F_1 is not so heavy as the mean of the parents either way the cross is made. Crossing tends to obliterate sexual differences. The general effect of cross-breeding is not, as has often been stated, to increase the rate of maturity in weight. Crosses give a slightly larger proportion of carcase, gut fat, tongue and heart than the pure breeds. The pure-breds are heavier in hide, head and blood.—The coefficient of variation of live weight ranged between 7.29 and 11.98. This coefficient decreased between 1893 and 1913. The coefficients of variation for steers 33 months old were, carcase 4.0; suet fat 20.4; gut fat 24.7; tongue 10.4; head 6.3; heart 12.5; tripe 15.8; hide 10.1; blood 17.2; intestine 21.8; unaccounted for 23.5.—*John W. Gowen.*

891. HANSEN, W. Die Pflanzenzüchterische Buchführung und Bewertung der Zucht-pflanzen. [Plant-breeding book-keeping and evaluation of the parent plants.] Zeitschr. Pflanzenzücht. 6: 119-138. 2 fig. Dec., 1918.—The methods followed at the plant-breeding station of Eckendorf near Bielefeld, Germany, in the collection and recording of field data on breeding-plats with field crops are described in this article. The several observations may be grouped as follows: (a) pedigree work; (b) observations on growing plants, harvest data, and plans of selection plats; (c) notes taken during selection work; (d) behavior of the characters in the various strains and families; and (e) guide to working methods, diary of work performed, meteorological data, and germination tests.—Numerous specimen observation and breeding forms specially arranged for recording various data on the cereal grasses, legumes, and fibers, are included.—*H. M. Steece.*

892. H(ARLAND), S. C. The new theory of the origin of Sea Island cotton. Agric. News (Barbados) 19: 100-101. 1920.—"Facts suggest that Sea Island cotton originated from a natural cross between a glabrous, broad-leaved West Indian native, with botanical affinities to *G. brasiliense*, and some variety of American Upland." Author crossed a West Indian native cotton of this type with an American Upland and obtained an F_1 which was morphologically almost indistinguishable from Sea Island and had fine silky lint more than 40 mm. long. Several F_2 plants also resembled Sea Island. "Actual reconstruction of Sea Island cotton by this means has not been accomplished" but West Indian native type comprises many different strains. "Synthesis of Sea Island cotton could probably only be effected as a result of the segregation of some rare gametic combination."—*T. H. Kearney.*

893. HARRISON, J. W. HESLOP. A preliminary study of the effects of administering ethyl alcohol to the lepidopterous insect *Selenia bilunaria*, with particular reference to the offspring. Jour. Genetics 9: 39-52. Dec., 1919.—High mortality resulted from raising this insect, from egg to adult, in alcohol fumes. The one male and four females that survived this treatment were crossed with controls. Offspring from these crosses (100 eggs used) were "greatly superior in several respects" to the controls; namely, in regard to viability of the eggs and larvae, rate of development, pupal weight, and vigor (shown by pigmentation). In spite of the small numbers, the author feels certain that these results are real, more especially since PEARL's work with fowls seems to offer support. PEARL's hypothesis of the selective effect of the alcohol treatment is explained at length.—*E. C. MacDowell.*

894. HARRISON, J. W. HESLOP. The inheritance of melanism in the genus *Tephrosia* (Ectropis) with some consideration of the inconstancy of unit characters under crossing. Jour. Genetics 10: 61-86. 3 fig. July, 1920.—In crosses within limits of species *T. crepuscularia*, inheritance of melanism proceeds on ordinary Mendelian lines. On the contrary, in

interspecific crosses between *T. crepuscularia* and *T. bistortata* a nondescript series of intergrades results in F_2 in respect to this same character. Thus, what behaves as a single unit character in one cross shows itself highly inconstant in another, owing, author believes, to "contamination of the gametes." This difference is intimately connected with inability of chromosomes in wider crosses to play their normal parts, owing to "incompatibility." If genetic factors may thus be modified by hybridization, possibility of their modification by other agents seems not excluded.—*F. B. Sumner.*

895. HARTMAN, CARL G. **The free-martin and its reciprocal: Opossum, man, dog.** *Science* 52: 469-471. Nov. 12, 1920.—The author describes very briefly an intersexual opossum: "externally, normal penis, empty scrotum, small malformed pouch, head rather like that of a female; internally, reproductive organs distinctly of the female type, infantile in development, consisting of vaginal canals, uteri, Fallopian tubes, and small round bodies in the situation of the ovaries." These bodies consisted of a thin albuginea, and a mass of tubules of uniform size consisting apparently of Sertoli cells only.—The history of the specimen was not known. The author, arguing from analogy, interprets it as a "reciprocal free-martin"; i.e., a sex-intergrade zygotically male, which in its ontogeny develops female characters. He points out the opportunity that exists in the crowded pregnant uterus of the opossum for anastomosis of foetal circulations, which might account for such a condition if the female of a fused pair developed sex hormones in advance of the male. Fusion of placentae has been observed in dog embryos by EVANS; and ESCHRICHT describes a case of fused placentae in a case of two-sexed human twins in which the male was similar to the opossum described above, and the female was normal. The principles involved are considered to throw much light on the entire subject of hermaphroditism in mammals.—*Frank R. Lillie.*

896. HENDRICKSON, H. C. **The selection of seed corn in Porto Rico.** *Porto Rico Agric. Exp. Sta. Circ.* 18. 22 p., 7 fig. Sept. 2, 1920.—Intended as a practical guide to farmers. Contains no new methods. [See also *Bot. Absts* 7, Entry 614.]—*E. E. Barker.*

897. HENRY, A. **Sports and varieties of trees: A new sport of the lime tree.** *Gard. Chron.* 68: 180. Oct. 9, 1920.—A large secondary branch of *Tilia vulgaris* bore leaves which were white with rare patches of green. The white leaves yielded to alcohol less than one-twentieth of the chlorophyll found in normal leaves.—*John Belling.*

898. HERLANT, MAURICE. **L'acide carbonique comme agent de parthénogénèse expérimentale chez l'oursin (Paracentrotus).** [Carbonic acid as an agent of experimental parthenogenesis in the sea-urchin (Paracentrotus).] *Compt. Rend. Soc. Biol.* 83: 188-190. 1920.—DELAGE found eggs of sea-urchin, unlike those of starfish, were not activated by exposure for an hour to sea water saturated with carbon dioxide. Author obtains development in sea-urchin egg by exposing it to carbon dioxide one and one-half to two minutes, returning to sea water for 20 to 30 minutes, then putting into hypertonic solution equal time. He conceives first treatment to activate egg as whole, second to produce asters by which division is effected.—*A. Franklin Shull.*

899. HOVASSE, R. **Le nombre des chromosomes chez les têtards parthénogénétiques de grenouille.** [The number of chromosomes in parthenogenetic tadpoles of the frog.] *Compt. Rend. Acad. Sci. Paris* 170: 1211-1216. May, 1920.

900. HUME, A. N., M. CHAMPLIN, AND M. FOWLDS. **The influence of length of wheat heads on resulting crops.** *South Dakota Agric. Sta. Bull.* 187: 139-158. 1919.—Twelve hundred plants of Bluestem wheat were grown under nearly identical conditions. From these, two hundred and sixty were selected, having as nearly as possible the same number of stools—the reason for this selection being that stooling differences should be eliminated as a factor, if possible. The length of the central head of each plant was measured. From each of those heads twenty seeds were selected at random and were planted at uniform spaces in individual head-rows. The yield of grain from each row was recorded and correlated with the length

of the mother head. A slight positive correlation ($r = 0.17 \pm 0.04$) was found.—Seed was preserved from these head-rows and was planted in similar rows the following year, and a correlation coefficient determined for yields of rows and length of the original mother heads. There was found to be no correlation in the second, third, fourth or fifth generations after the selection of the original mother heads.—These results show that the length of the central spike cannot be considered as an indicator of the relative yielding-ability of mother plants.—*A. N. Wilcox.*

901. IBSEN, HEMAN L. Tricolor inheritance. IV. The triple allelomorphic series in guinea-pigs. *Genetics* 4: 597-606. Nov., 1919.—Presentation of data on 19 of the 21 possible matings corroborating theory of triple allelomorphism of complete (E), partial (e^p), and no (e) extension of black or chocolate pigment. Also data are given on litter size and sex ratio for the various matings. Departures from the expected ratios are found and explanations are suggested.—*P. W. Whiting.*

902. JORDAN, EDWIN O. The differentiation of the paratyphoid enteritidis group. *Jour. Infectious Diseases* 26: 427-434. May, 1920.—Article is based on the results of 6 years' observation. A culture, isolated from human blood, supposedly paratyphoid-B type, at first gave typical cultural reactions (especially on sugars) and agglutination. Twelve colonies regrown from the plating of the original culture displayed varying characteristics in the fermentation of carbohydrates, end products, agglutination, and absorption of heterologous immune serum; this is shown in several tables. Author concludes that substrains differing from the parent strain are not only possible, but most frequent; this is proven both in vivo et in vitro.—The limits of variability were not determined.—*Andrew I. Dawson.*

903. KALT, B. Der Begriff "Originalsaatgut" und seine Anwendung bei der Züchtungsanerkennung. [The concept "Original seed" and its application in the recognition of breeding.] *Fühlings Landwirtsch. Zeit.* 1919: 460-471. 1919.—Much confusion is found concerning conceptions of "Original seed." That seed which is first offered for sale as the product of a well-planned system of breeding, and which is produced by the breeder or under his supervision is called "Original seed." Author emphasizes the need of organizations adopting uniform rules and regulations for the inspection and certification of such seed. [See also *Bot. Absts.* 7, Entry 619].—*C. M. Woodworth.*

904. KNIPE, H. [German rev. of: BURGER, OWEN F. Sexuality in *Cunninghamella*. *Bot. Gaz.* 68: 134-146. Aug., 1919. (See *Bot. Absts.* 3, Entry 2097.)] *Zeitschr. Bot.* 12: 518-520. 1920.

905. LAW, S. C. An albino bulbul. *Avic. Mag.* 11: 111-112. July, 1920.—An albino specimen of the black Indian bulbul was found in a nest with another youngster of the usual color. According to the description and colored plate the albino was pure white and pink-eyed.—*Sarah V.H. Jones.*

906. LÉCAILLON, A. Sur la reproduction et le développement des bivoltins accidentels et de la première génération qui en dérive, chez le *Bombyx du Mûrier*. [On the production and development of accidental bivoltins and the first generation derived from them in the silkworm (*Bombyx mori*).] *Compt. Rend. Acad. Sci.* 168: 366-368. 1919.—The author has shown previously (*Compt. Rend.* 165: 603 et 683, 1917), that accidental bivoltin eggs appearing in races of univoltins undergo a change of color from yellow to white, the embryos developing within ten days in place of ten months.—To study the history of accidental bivoltins further, the author selected five pairs of accidental bivoltin moths. These oviposited in the summer of 1917, the eggs hatching in the spring of 1918, simultaneously with eggs of univoltin parents oviposited two months earlier.—In the next generation, descendants differed with different females.—In one case, bivoltins were produced, in a second case, although eggs became white as with bivoltins, some eggs only hatched, eggs that failed to hatch becoming rose-color (arrested development). In a third case some eggs were univoltin and some

bivoltin, the latter hatching at once. Females of the fourth and fifth pair produced univoltins only. All bivoltin moths of 1918 produced yellow eggs which hatched in the spring of 1919.—Thus while in the typical univoltin race only one kind of egg exists, in the accidental bivoltins there are two kinds, summer eggs and winter eggs, the latter hibernating.—Accidental bivoltins, therefore, do not transmit wholly and immediately to all their descendants the aptitude to produce alternately summer and winter eggs, but to a certain number only. The new character appearing in bivoltins is not, therefore, represented by a mutation in the DE VRIESIAN sense.—*Isabel McCracken*.

907. LEHMANN, ERNST. *Neuere Oenotherenarbeiten. (Sammelreferat II).* [New work with *Oenothera*. (Composite review).] *Zeitschr. Bot.* 12: 61–85. 14 fig. 1920.—Paper is second of a series of composite reviews of the latest *Oenothera* literature, the first having appeared in 1917 (loc. cit., 10: 517), and presents in an extended discussion amplified by original diagrams the work of ATKINSON, BARTLETT, DAVIS, KRANICHFELD, LOTSY, RENNER, and DE VRIES (1915–1920) in so far as the investigations of these authors throw new light upon the two chief questions:—(1) Is *Oe. Lamarckiana* a hybrid or a pure species? (2) How do mutations appear and thus build up new species in the genus *Oenothera*?—The following classification of recent investigations is also included: (1) DE VRIES, evidence obtained from crossing. (a) The establishment of the hypothesis of heterogamy; (b) Twin hybrids. (2) HONING, anatomical evidence upon the hybrid nature of *Oe. Lamarckiana*. (3) HERIBERT-NILSSON, the red-nerve factor and the impossibility of its existence in a homozygous condition. (4) BARTLETT, mass-mutation in *Oe. pratincola*. (5) RENNER, sterile seed and selective pollen-tube growth. (6) LUTZ, GATES, STOMPS et al., chromosome counts in *gigas* and *lata* forms.—*Paul A. Warren*.

908. LINHART, G. A. A new and simplified method for the statistical interpretation of biometrical data. *Univ. California Publ. Agric. Sci.* 4: 159–181. 12 fig. 1920.—Graphic method of fitting GAUSSIAN and GALTON-MCALISTER frequency curves. Use of latter urged when deviations are large in comparison with mean.—*Raymond Pearl*.

909. LIPPINCOTT, WM. A. Improving mongrel farm flocks through selected standard-bred cockerels. *Kansas Agric. Sta. Bull.* 223. 48 p., 30 fig. Jan., 1920.—Four pens, ten each, of mongrel females were mated respectively with a standard-bred White Orpington male, a standard-bred Barred Plymouth Rock male, a standard-bred South Carolina White Leghorn male, and an unselected mongrel male. Standard-bred males in most cases had high-laying pedigree. In second year, offspring from these matings were again bred in same numbers to other males of same varieties. This was repeated with second generation. Decided improvement in laying qualities was obtained through the Plymouth Rock and White Leghorn males. Through the mongrel males nearly as good results were obtained. The White Orpington males produced no improvement. Latter is explained through lack of pedigree in standard-bred males. In all cases fair uniformity in type and color was obtained by the third generation through the standard-bred males. Laying records are given for those offspring only that were selected for mating.—*H. G. May*.

910. LITTLE, C. C. Note on the occurrence of a probable sex-linked lethal factor in mammals. *Amer. Nat.* 54: 457–460. Sept.–Oct., 1920.—The sex ratio of a highly inbred strain of Japanese waltzing mice, all descendants of one pair of individuals, was 53.2 ± 5.7 , while that for inbred non-waltzing mice was 103.1 ± 2.8 , a difference in the ratios of 7.9 times the probable error. Further expected results were obtained in the number of males resulting from reciprocal crosses of waltzing by non-waltzing stock. Data obtained from back-crosses of the lethal-carrying females on F_1 's of normal by waltzing and the litter size of a pure strain of waltzing mice, were also in keeping with the assumed recessive sex-linked lethal. Preliminary report.—*Sarah V.H. Jones*.

911. LITTLE, C. C. Factors influencing the growth of a transplantable tumor in mice. *Jour. Exp. Zool.* 31: 307–326. Oct. 5, 1920.—The tumor used in the experiments was found as a spontaneous growth in a strain of Japanese waltzing mice by TYZZER. It had been

propagated by continued inoculation for 40 implant-generations, during seven years.—675 mice were used, of two kinds, common domestic mice of European strains, and animals which had one European parent and one F_1 , European \times Japanese, parent. It had been found previously that the susceptibility to the transplanted tumor of the Japanese parent was completely dominant in the F_1 . Genetic analysis of the genes responsible for this difference in susceptibility will be published later. Author states presence of several factors necessary to produce susceptibility. Among animals of the $F_1 \times$ European class there is therefore great genotypic diversity. In this paper the whole $F_1 \times$ European class is treated statistically and its susceptibility compared to the pure European class. In this latter class 11.12 per cent of the observations made showed positive tumor-growth, in the $F_1 \times$ European class, 17.54 per cent of the observations were positive. In this class there was found a distinct difference in tolerance for tumor-growth between younger and older mice of female sex. Certain factors of the Japanese genotype must in some cases, even when separated, exert a favorable influence upon temporary growth of tumor. The Japanese strain, which was found to possess twelve to fourteen independent genes absent from European mice and favoring growth of a different tumor if present in combination was found to be remarkably pure. (The Japanese waltzer is a variety of the common Oriental domestic mouse, which is zoologically quite different from *Mus musculus* and is probably derived from *Mus wagneri* Ref.)—A. L. Hagedoorn.

912. LLOYD-JONES, O., AND J. M. EVVARD. Studies on color in swine. I. The hereditary relationship of the black of the Hampshire and the red of the Duroc-Jersey. Iowa Agric. Sta. Res. Bull. 53: 203-208. 1919.—Authors point out that while the white of Yorkshires or Chester-Whites is completely dominant to the black of Berkshires or Poland-Chinas, a blue roan generally with a white belt results when a Hampshire (black with white belt) is crossed with a Chester-White. They also point out that while the Berkshires or Poland-Chin as crossed with red breeds (Duroc-Jerseys or Tamworths) give red animals with black patches, black animals sometimes having white belts are produced when Hampshires are crossed with Duroc-Jerseys. Evidence is also given to prove that in the last-mentioned cross black is a simple dominant.—H. L. Ibsen.

913. MACCURDY, H. M. Division, nuclear reorganization and conjugation in *Arcella vulgaris*. Michigan Acad. Sci. Ann. Rept. 21: 111-113. 1919.—The number of daughter cells produced by a single individual is limited, and varies from none to twenty-seven. The members of a pair of ex-conjugants tend to produce the same number of daughter cells at about the same rate. In lines derived from a single individual, "depression" periods and conjugation occur at intervals of from four to six weeks; while some members of a line are depressed, others undergo conjugation. Individuals may pass successfully through a period of depression and enter upon a new period of division. Preparations of cells made during the time of depression show the vegetative nuclei inactive or breaking up, and "secondary" nuclei forming from part of the chromidial net. Preparations of conjugating individuals show remarkably similar conditions. In many cases, the secondary nuclei have been observed to enter daughter cells, while the old vegetative nuclei remain in the old shell. If the nuclei constitute the germ-plasm, its continuity is interrupted at the time the old vegetative nuclei cease to divide and begin to disintegrate, and the secondary nuclei are organized from the chromidial net and pass into the daughter cells. If chromidiogamy occurs at the time of conjugation, as is maintained, nuclear continuity is still interrupted, and is only secured in the process of construction of new nuclei out of the chromidial net. There is thus a discontinuity of nuclei with a nuclear cycle of development. If the nuclei are successively similar at corresponding stages, the lines run true; if not, variations due to their dissimilarities are produced.—Bertram G. Smith.

914. MACCOUN, W. T., AND M. B. DAVIS. Progress in apple breeding for the Canadian prairies. Proc. Amer. Soc. Hort. Sci. 1919: 13-18. 1919.—The Canadian prairies are situated between 49° and 53° north latitude and between 97° and 114° west longitude. Altitudes range from 700 feet to 4200 feet. Spring is early; buds swell in April. Summers are rela-

tively warm. Winter begins the last of October and winter temperatures are sometimes -40° to -50° or lower. The most trying times for trees are (1) Spring; severe frosts after buds swell are frequent and kill all growth. (2) Late autumn or early winter when trees are badly frozen while foliage is still on. (3) Winter. Long-continued spells of severe cold. All these factors require closer investigation. It has been found difficult and practically impossible over most of the area to bring commercial varieties of apples to bearing age.—For the past 30 years many varieties have been tested at Experiment Stations and by individuals in Manitoba, Saskatchewan and Alberta, but few trees have borne and, when they have, they have not lived long afterwards. Seedlings of *Pyrus baccata* from seeds obtained in Russia were distributed to Brandon, Manitoba, and Indian Head, Saskatchewan, in 1890. These proved hardy and fruited well in 1894. Crossing in the hope of increasing size and quality while still retaining hardiness was begun in 1894. With *Pyrus baccata* and *Pyrus prunifolia* as pistillate parents and 21 varieties as pollen parents, 800 seedlings were grown from the crosses. These were distributed in 1902 to various places at altitudes from 740 to 4200 feet. At the lower elevations in southern Manitoba most of the trees proved hardy and, had the fruit been larger, would have been satisfactory; but at higher altitudes only two of the 17 best proved hardy in exposed places. These two are named Columbia and Osman. Columbia is from the cross *Pyrus baccata* \times Broad Green, a summer Russian variety. Osman is from the cross *Pyrus baccata* \times Osimoe, which is also a Russian variety ripening in August. In 1904 Dr. SAUNDERS recrossed the best of the first generation crosses, using 18 varieties of apples, still with the hope of increasing size and quality and retaining hardiness. There were 407 trees obtained from these second crosses the first of which fruited in 1910. Most of the trees were grown at Ottawa and fruits have been described from 223 of them. The fruit of 171 or 76.68 per cent was under two inches in diameter, or little or no larger than fruit from F_1 crosses. The fruit of 48 or 21.52 per cent was between 2 and $2\frac{1}{4}$ inches and three bore fruits between $2\frac{1}{4}$ and $2\frac{1}{2}$ inches. One bore fruit 2.62 inches in diameter. Fruits of most second generation crosses have long slender stems, thin tender skin and the crisp breaking flesh characteristic of crabs. From the very few F_1 generation which proved hardy under the most trying conditions, it is doubtful if any second generation seedlings will prove hardy in the high altitudes, but several have fruited at Morden, Manitoba, and it is hoped that some of them will extend the area over which apples may be grown.—Details are given of some of the second generation crosses and it is shown that Pioneer (*Pyrus baccata* \times Tetofsky) \times McIntosh gives a higher percentage of comparatively large apples and higher percentages of fruit of good quality and high color than when Ontario, Northern Spy, or Cranberry Pippin are used as pollen parents.—Results lead to the conclusion that in breeding for quality it is necessary to choose as one of the parents a variety possessing the desired character developed to the highest possible perfection. From experience to date, production of varieties hardy enough to survive the test of the Canadian prairies, by methods thus far used is regarded as doubtful. It is proposed in future work to use *Pyrus baccata* as the male rather than as the female parent as it is believed a large percentage of the F_1 crosses will be apples of marketable size and at least a few of them may prove hardy.—C. S. Crandall.

915. MARSHALL, F. R. Some experiences in breeding range sheep. National Wool Grower 8: 35-37. Jan., 1918.—A description of some of the work of the Bureau of Animal Industry at Laramie, Wyoming. Comparison is made of the lambing and shearing records of Rambouillet, Lincoln-Merino crossbreds and Corriedales under range conditions. The records indicate that very fine wool is usually associated with shorter staple and lighter fleece.—G. F. Finlay.

916. McEWEN, GEO. F., AND ELLIS, L. MICHAEL. The functional relation of one variable to each of a number of correlated variables determined by a method of successive approximation to group averages: A contribution to statistical methods. Proc. Amer. Acad. Arts Sci. 55: 95-133. Dec., 1919.—The authors attempt to develop a method of multiple regression independent of any assumption as to form of regression lines. Material is grouped with respect to each independent variable, and simultaneous equations formed expressing group

averages of dependent variables when all but one independent variable are held constant. These equations may be solved directly, but authors prefer method of successive approximation. Corrections are also obtained for variability within the group.—*John Rice Miner.*

917. MEUNISSIER, A. **Observations faites à Verrières par Philippe de Vilmorin, sur le caractère "Hile noir" chez le pois.** [Observations made at Verrières by Philippe de Vilmorin on the character "black-eye" in the pea.] Jour. Genetics 10: 53-60. July, 1920.—Most peas have seeds with uncolored hilums or "eyes." Several varieties of black-eyed peas are described. Black-eye \times "white-eye" gives black-eye in F_1 and 3 black-eye: 1 white-eye in F_2 (TSCHERMAK and VILMORIN). Exceptional results sometimes obtained, such as some black-eyed progeny from crosses between two white-eyed varieties. Occurrence of plants from such crosses with both black-eyed and white-eyed seeds in same pod or on same plant. Accidental crossing responsible for some cases, but not when both kinds are on same plant. A cross between uncolored seed-coats \times garnet (reddish brown) seed-coats, produced in about the F_2 generation a few seeds with purple seed-coats (fluctuating unfixable character). Three years later this purple-seed-coat race produced black- and "white-eyed" peas on the same plants. Association of purple and "garnet" in same seed-coat gives appearance of black. Purple seed-coat color and black eye tend to be genetically associated in some peculiar manner. Tables showing observations given. Totals show 615 black-eyed seeds gave 407 progeny with violet seeds to 208 plants with non-violet seeds; 562 white-eyed seeds produced by the same plants from which the 615 black-eyed seeds came, gave 58 progeny with violet seeds to 504 with non-violet seeds.—*Orland E. White.*

918. MEUNISSIER, A. **De quelques idées sur la selection des légumes.** [Some ideas on the selection of vegetables.] Rev. Hort. 91: 300-303. June, 1919.—Popular discussion of pure lines, genotypes, phenotypes, and modern ideas of selection in relation to horticulture.—*Orland E. White.*

919. MORGAN, T. H. **Castration of hen-feathered Campines.** Proc. Soc. Exp. Biol. Med. 17: 70. 1920.—The results were the same as with hen-feathered Seabrights; namely, the development of male plumage following the operation.—*H. D. Goodale.*

920. MORGAN, T. H. **The endocrine secretion of hen-feathered fowls.** Endocrinology 4: 381-385. 5 fig. July-Sept., 1920.—A restatement of the author's findings that in Seabrights, and Campines, the hen-feathered condition depends upon the presence of luteal cells both in the ovary and testes.—*H. D. Goodale.*

921. MORGAN, T. H. **Whitman's work on the evolution of the group of pigeons.** [Rev. of: WHITMAN, CHARLES OTIS, 1919. Posthumous works of, edited by Oscar Riddle. Carnegie Inst. Publ. No. 257. 3 vol.] Science 51: 73-80. Jan. 23, 1920.—Reviewer finds no real contradictions between the results of WHITMAN, or even his interpretations, and the idea of discontinuity or mutation. Unit characters, when their development and manifestations are interpreted from the standpoint of chemistry, need not be so absurd as WHITMAN conceived them to be. Since any or all steps in ontogeny may be modified by a single factor, WHITMAN seems to have put undue emphasis upon ontogenetic development in his interpretation of phylogenetic relationships.—*H. G. May.*

922. NEVENS, W. B. **Breed and size of cows as factors affecting the economy of milk production.** Jour. Dairy Sci. 2: 99-107. 3 fig. 1919.—A ratio, based on the geometrical theorem that the surface of two solids of similar shape are to each other as the squares of the cubes of their weights, is worked out to show the relation between the maintenance requirements of animals of different weights. Thus the maintenance requirements of a cow of known weight being available, the maintenance requirements of cows of any known weight may be calculated.—A study of the records, weights and feed consumption of the cows used in the Wisconsin cow competition indicates that the larger cows of the Holstein, Guernsey and Jersey breeds consumed less feed in proportion to size than did the smaller cows. Also the

larger cows were more economical producers than the smaller cows. The Holsteins of the heaviest class produced 29.2 pounds more milk for each 100 feed-units than did the Holsteins of the lightest class, while the largest Guernseys produced 20.5 pounds more milk than the lightest class, and the heaviest-class Jerseys produced 21 pounds more milk per 100 feed-units consumed than the lightest class. The larger animals are also shown to be more economical producers of total solids and butter-fat than the smaller animals.—The Holsteins in this contest were the most efficient producers of milk and total solids, while the Guernseys and Jerseys were the most efficient producers of butter-fat.—*R. R. Graves.*

923. ONSLOW, H. **Inheritance of wing colour in Lepidoptera IV. Melanism in Boarnia abietaria.** Jour. Genetics 10: 135-140. 1 pl. Aug., 1920.—Inheritance of melanism was previously described by author in related species,—*Tephrosia consonaria* and *Bosnaria consortaria*. These three species are confined to Kent and Surrey (with another melanic variety *Tephrosia extensaria (luridata)*). [ONSLow, Jour. of Genetics, 9: 53, 339. Dec. 1919, Mar. 1920.] In melanic form has wings of female uniform velvety black, of male, slightly browner, distal streak and veins traced in deeper black, otherwise unmarked. Type strain varies in color and markings from very dark to golden brown. Females slightly darker than males.—Character of matings made: *Melanic* × *melanic*, where one parent at least was homozygous ($DD \times DD$ (DR); *melanic* × *melanic* where both parents were heterozygotes ($DR \times DR$); *melanic* × type where *melanic* parent was homozygous ($DD \times RR$); *melanic* × type where *melanic* parent was heterozygous ($DR \times RR$). In each of these crosses the *melanic* parent behaves as a simple Mendelian dominant to type forms. In a certain brood from *melanic* × type, the male parent being comparatively very light, light offspring and *melanics* appeared in equal numbers as expected, the light offspring appearing lighter than in other strains but not so light as male parent.—Results in agreement with conclusions of BOWERS (Ent. Rec. 11: 82, 1899), and STALLMAN (Ent. Rec. 28: 21, 1916) in experimental breeding of *melanics*.—*Isabel McCracken.*

924. [PEARSON, KARL.] **Peccavimus.** Biometrika 12: 259-281. Nov., 1919.—This paper cites certain errors which have crept into publications of biometrical formulae. The corrections are indicated.—*John W. Gowen.*

925. PENNYPACKER, J. Y. **Observations on the beach plum. A study in plant variation.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 231-270. Pl. 66-70. 1920.—Author is impressed with marked variation in the beach plum (*Prunus maritima*) and suggests that this species is undergoing mutational variation along several lines due to environmental factors. Primitive color is supposed to have been greenish yellow or red. Through transformation of chloroplastids to chromoplastids pure yellow fruits arose along one evolutionary line. Development of purple and then blue considered another line. Reference is made to BURBANK's hybridization work with *P. maritima*. Detailed description is given of nine varieties of the species of interest especially to taxonomists.—*James P. Kelly.*

926. PRIDHAM, J. T. **Breeding cereals at the experiment farms.** Agric. Gaz. New South Wales 31: 697-698. 1920.—Summary is given of plant-breeding work and nursery trials at several of the experimental farms.—*L. R. Waldron.*

927. PUNNETT, R. C. **The early elimination of surplus cockerels.** Jour. Bd. Agric., London 25: 1319-1323. 1 fig. 1919.—Author shows how appropriate crosses of races of poultry, involving sex-linked factors which manifest themselves in the down, make it possible to distinguish the sex of the offspring at hatching. Suggests possible practical applications.—*William A. Lippincott.*

928. RICHARDSON, C. W. **Some notes on Fragaria.** Jour. Genetics 10: 39-46. 2 fig. July, 1920. The work is a continuation of that published in the same Journal 3: No. 3, 1914, and 7: No. 3, 1918. [See Bot. Absts. 2, Entry 494.] The results of certain crosses are given with regard to the inheritance of flower color, double flowering, shape of foliage, variegation in

foliage, fruit flavors, size of fruit, runners and sex. Pink flowers and doubleness were found to be dominant over white flowers and singleness. Because of its heterozygous condition with regard to leaf shape *Fragaria grandiflora* is considered to be a hybrid of *F. chiloensis* or *chinensis* and *virginiana*. Crosses of ♀ × ♂ or ♂ × ♀ have thus far given 203 ♀ and 173 ♂ or ♂.—W. D. Valleau.

929. RICHEY, FREDERICK D. The inequality of reciprocal corn crosses. Jour. Amer. Soc. Agron. 12: 186-196. 1920.—Reciprocal crosses between varieties or strains of maize are sometimes unequal. Possible causes of such inequalities are suggested as a difference in the food materials furnished the young plants by the different maternal parents and a difference in germinal reactions with different cytoplasm. The experiments show that some type of sex-linked inheritance must at least be considered as a possible cause of inequality between reciprocal maize crosses, by the unequal transmission from No. 199 as staminate and as pistillate parent.—F. M. Schert.

930. RIEBESELL, P. Einige zahlenkritische Bemerkungen zu den Mendelschen Regeln. [Some remarks critical of ratios in Mendelian inheritance.] Biol. Zentralbl. 38: 329-340. Aug., 1918.—An investigation of the criteria for goodness of fit of theoretical Mendelian ratios to be observed. On any given hypothesis as to relation of hereditary factors to external characters, number of factors may be found by mathematical process. Thus if one character occurs only with presence of all factors, equation will be: $\frac{3^m}{4^m - 3^m} = \frac{n_1}{n_2}$ where m = number of factors, n_1 and n_2 = observed frequencies of alternate characters, whence $m = \frac{\log n - \log n_1}{\log 4 - \log 3}$ ($n = n_1 + n_2$). The probability of two hypothetic ratios may be compared in several ways: (1) by their deviation from the observed; (2) by the ratios of these deviations to their standard deviation; (3) by the probabilities that the theoretical ratios shall be found in a population in which the observed ratio has occurred; (4) by the ratio of the probability of the observed to that of the most probable value; (5) by the probability of a deviation as great as or greater than that of the observed from the theoretical. For small numbers of observations no one ratio can be picked out as the only likely one. All criteria depend on assumption of Gaussian distribution, which is violated by hypothesis of linkage and other extensions of Mendelian theory. Where more than one hypothesis is admitted by criteria, ratios in F_3 will often determine right hypothesis.—John Rice Miner.

931. SALAMAN, R. N. The technique of cross-fertilization in potatoes. Potato Mag. 3: S, 12, 26. 1 fig. 1920.—Brief description is made of female and male organs of potato flowers and difficulties encountered in cross-fertilizing are mentioned. Instruments and materials required in crossing are given and the various operations of selecting buds, sterilizing, emasculating, labeling, covering, pollinating, protecting seed in field, harvesting and extracting seed, sowing seed and growing seedlings are described in detail. A simple and less certain method is also described as well as operations required in self-fertilizing. Successful fertilizations are never more than 5 per cent of individual blossoms treated.—Richard Wellington.

932. SALAMAN, R. N., AND J. W. LESLEY. Genetic studies in potatoes. The inheritance of an abnormal haulm type. Jour. Genetics 10: 21-38. 4 pl. July, 1920.—Two distinct types of potato stems were found and named respectively "prostrate" and "procumbent." The former differed mainly from the normal in that the stems were either deficient or entirely wanting in interfascicular secondary growth, consisting mostly of xylem, and in that upright habit of growth was absent. The latter seemed to be an intermediate between "prostrate" and "upright" varieties, as it resembled the "prostrate" in stem structure and the "upright" in growth habit. In a study of the inheritance of the "prostrate" habit, it was found to behave as a recessive character, the ratios indicating that it differed from the "upright" in at least two and probably three factors. No correlation was found between the "prostrate" habit and other characters.—Richard Wellington.

933. SALMON, E. S. On forms of the hop (*Humulus lupulus* L., and *H. americanus* Nutt.) resistant to mildew (*Sphaerotheca humuli* (D. C.) Burr.). IV. Ann. Appl. Biol. 6: 293-310. 1920.—In continuation of studies previously published the author now reports three groups of hop plants immune or resistant to hop mildew (*S. humuli*). Group 1 comprises several forms of a variety having yellowish-green leaves and known as the "Golden Hop." A female form is immune and a male form is susceptible to the attacks of mildew both when grown in a greenhouse and in the open. Another female form of this type is slightly susceptible to this fungus in the greenhouse only.—Group 2 comprises individual seedlings of the wild hop (*H. lupulus*) raised from seed obtained from Vittorio, Italy. Certain individuals proved to be immune, others highly susceptible to mildew. It is stated that the seedlings which are immune when grown in the greenhouse may, when grown in the open, show susceptibility, which as a rule is slight. The conclusion is drawn that different seedlings have distinctive physiological or constitutional characters, which are constant under the same environment and confer immunity or susceptibility upon the respective seedlings.—Group 3 comprises a male form of *H. americanus* which is immune to mildew when grown in a greenhouse. Under the same conditions several American cultivated varieties proved susceptible.—W. W. Stockberger.

934. SKUPIENSKI, F.-X. Sur la sexualité chez les Champignons Myxomycètes. [On sexuality in the Myxomycetes.] Compt. Rend. Acad. Sci. 167: 31. July, 1918.

935. SLOCUM, ROB R. Selection and care of poultry breeding stock. Bur. Anim. Ind., Farmers Bull. 1116. 10 p., 6 fig. 1920.—Practical suggestions concerning management of a breeding stock.—William A. Lippincott.

936. SLONAKER, JAMES R. Some morphological changes for adaptation in the mole. Jour. Morphol. 34: 335-372. 4 pl. 1920.—In adaptation to fossorial habits, the sternum, pectoral girdle and fore-limbs of the American mole, *Scalops aquaticus*, have been greatly enlarged and modified, thus increasing the size of the anterior part of the body. To allow the enlarged anterior part of the body to pass the posterior part when the animal turns in its burrow, the pelvic girdle has been very much reduced in diameter. The reduction in the size of the pelvis has so narrowed the pelvic outlet that it is impossible for the urogenital and alimentary tracts to pass through it and still function; this necessitates their passage outside the bony arch—a condition very unusual in mammals. The eyes are so degenerate that they are doubtless able to function only in perceiving the difference between light and darkness. To compensate for the deficiency in sight, special tactile organs have been developed on the snout and on the margins of the fore-feet.—Bertram G. Smith.

937. STEINACH, E. Verjüngung durch experimentelle Neubelebung der Alternden Pubertätsdrüse. [Rejuvenation through experimental revitilization of the senile sex glands.] 68 p., 9 pl. Julius Springer: Berlin, 1920.

938. THOMSON, J. A. Modern study of heredity. [Rev. of: MORGAN, THOMAS HUNT. The physical basis of heredity. 14 × 21 cm., 300 p., 117 fig. J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Absts. 5, Entry 422.) Jour. Roy. Microsc. Soc. 1920: 354-357. Sept., 1920.

939. TISCHLER, G. Ueber die sogenannten "Erbsubstanzen" und ihre Lokalisation in der Pflanzenzelle. [On the so-called hereditary substances and their localization in the plant cell.] Biol. Zentralbl. 40: 15-28. 1920.—Resumé of literature on composition and behavior of chromosomes in relation to their function as bearers of Mendelian hereditary factors. Discussion of their chemical composition, cytological behavior and their rôle in heredity.—E. G. Anderson.

940. VAN DE WEYER, W. Hybrid Buddleias. Gard. Chron. 68: 181. 1 fig. Oct. 9, 1920.—An account of hybrids of *B. globosa* with *B. variabilis magnifica*, and with *B. Madagascariensis*. Segregations as to foliage, color, seed characters, fertility and fragrance are briefly indicated.—J. M. Skull.

941. WHIPPLE, O. B. **Line selection work with potatoes.** Jour. Agric. Res. 19: 543-573. Sept., 1920.—Data are given on the performance of numerous hill selections made within the Russet Burbank, Rural New Yorker, Green Mountain, and Early Six Weeks potato varieties. The results show that selection is practically valueless in isolating high-yielding strains except during the first season. No definite correlation was found between number of tubers produced per plant and yield in pounds, but high-yielding plants were usually correlated with vigor and health. From the commercial standpoint, the results demonstrate the value of making selections each season and of using vigor and health as an index of productiveness.—*Richard Wellington.*

942. WISTER, JOHN C. **Notes on the history of the bearded iris.** Jour. New York Bot. Gard. 21: 181-191. Oct., 1920.—A historical sketch of the various *Iris* breeders from the earliest recorded work to present time. All varieties cultivated prior to 1890 or 1900 were derived from two species, *I. pallida* and *I. variegata*.—*J. Marion Shull.*

943. YASUI, KONO. **Genetical studies in *Portulaca grandiflora*.** Bot. Mag. Tokyo 34: 55-65. 1 pl., 1 fig. 1920.—The author describes crosses between single and double races belonging to 7 color types. Doubleness is dominant. Yellow is due to a yellow flavone derivative, which in the presence of a reducing factor (*R*) yields a magenta anthocyanin. White races lack either the chromogen factor (*C*) alone or both (*C*) and (*R*). Yellow single by white single (*CCrr* × *ccRR*) gives magenta *F*₁ (*CcRr*) and *F*₂ by selfing of 9 magenta, 3 yellow, and 4 white. Hybrid double magentas (*CcRrDd*) by white singles (*ccRRdd*) give magenta doubles, magenta singles, white doubles, and white singles in equal numbers. By yellow single they give equal numbers of yellow and magenta (*CcRrDd* × *CCrrdd* = 1 *CCrrDd* : 1 *CcRrDd* : 1 *CCrrdd* : 1 *CcRrdd* : 1 *CCrrDd* : 1 *CcrrDd* : 1 *CCrrdd* : 1 *Ccrrdd*). Double whites (*CcRrDd*) by pale yellow singles (*CCrrdd*) give equal numbers of magenta and yellow doubles and singles. Single scarlet by double white gives magenta double, which mated to single white gives equal numbers of magenta and white doubles and singles. The selfed singles from this give singles only; the selfed doubles, 3 doubles to 1 single. The singles mated to the doubles give 1 : 1 ratio.—*L. L. Burlingame.*

HORTICULTURE

J. H. GOURLEY, *Editor*

FRUITS AND GENERAL HORTICULTURE

944. FINDLAY, HUGH. **The handbook for practical farmers.** 558 p., 258 fig. D. Appleton & Company: New York and London, 1920.—See Bot. Absts. 7, Entry 609.

945. ALDERMAN, W. H. **The status of orchard fertilization experiments.** Proc. Amer. Soc. Hort. Sci. 16: 109-113. (1919) 1920.—Attention is drawn to the fact that the orchard fertilization work during the past 30 years in about 30 different experiment stations in this country has all been carried on in about the same general way. The information obtained up to the present time about which there is little contention narrows down to about four general headings; namely, (1) there are many apple orchards, growing under a wide range of conditions which do not respond to any fertilizer; (2) orchards in sod are most likely to respond to fertilizers; (3) starved orchards give a ready response to fertilization; and (4) nitrogen in a readily available form seems to be the only element of plant-food that is uniformly a factor in the favorable responses—when such are secured. The author states, "We may readily see and safely say that a normal plant probably has a definite arrangement of conditions within itself, which fit into its functions of growth and fruitage or reproduction. It is when the arrangement is distributed that we get reduced vigor, feeble growth or lack of productiveness." He suggests that either pruning, cultural methods, fertilization, or some combination of all of these may restore the normal optimum in the plant and produce the results desired. Instead of a fertilizer problem, the problem may be one of pruning or cultural practices, or a

combination of all. He suggests that we look into the inside of the tree rather than into the soil or other external factors. In other words, we should attempt to diagnose the trouble, and then make an attempt to discover a treatment for it. This means a need of men trained in physiology and chemistry, and of considerable laboratory work under more controlled conditions. It is suggested that, to start with, we should eliminate the error introduced by miscellaneous stocks and scions; and the writer suggests that buds or scions from a single parent tree should be worked upon root stocks, developed by cuttings or other asexual propagation from a single parent plant. It is suggested that in place of a "fertilizer project" we should have a "nutrition project," and that most of the old type of fertilizer experiments should be carried on as demonstrations by extension workers.—*E. C. Auchter.*

946. ALLEN, W. J. **Three new varieties of plums.** *Agric. Gaz. New South Wales* 31: 744-745. 1920.—Two new local seedling varieties, Higgins' Seedling and Wilson's Seedling, are described; also Tucker's Beauty, originated by LUTHER BURBANK, is described. The two local seedlings are of the cherry-plum type.—*L. R. Waldron.*

947. ALLEN, W. J., AND R. G. BARTLETT. **Spring work for the banana grower.** *Agric. Gaz. New South Wales* 31: 738-743. 1920.—Practical instructions are given covering selection of suckers, thickness and depth of planting, pruning, and depth of cultivation.—*L. R. Waldron.*

948. ANONYMOUS. **Original description of the Turley apple.** *Proc. Amer. Pomol. Soc.* 1917: 27. 1 pl. 1918.—The Turley apple, a seedling of the Winesap, was originated in 1900 in Lawrence County, Indiana, by JOE A. BURTON, Mitchell, Indiana. A detailed description of the apple is given.—*E. C. Auchter.*

949. ANONYMOUS. **Espaco entre coqueiros.** [Space between coconuts.] *Bol. Agric. Nova Goa* [Portuguese East India] 1: 17-19. 1919.—Considers the proper spacing of coconut palms for best results.—*John A. Stevenson.*

950. ANONYMOUS. **Formacion del olivo.** [Shaping the olive tree.] *Informacion Agric.* [Madrid] 10: 148-149. 3 fig. 1920.—Describes a method of pruning young olive trees to give the desired shape.—*John A. Stevenson.*

951. ANONYMOUS. **Grafting the mangosteen by inarching.** *Missouri Bot. Gard. Bull.* 8: 61-63. 1920.

952. ANONYMOUS. **The elements of hardy fruit culture.** [Rev. of: STAWARD, R. *Practical hardy fruit culture.* 216 p. Swarthmore Press: London, 1920.] *Nature* 105: 545. 1920.

953. ANTHONY, R. D. **Methods of interpreting results in orchard fertilizer experiments.** *Proc. Amer. Soc. Hortic. Sci.* 16: 113-117 (1919) 1920.—It is shown that many of our fertilizer experiments were planned and laid out before there was much published information on the subject. As a result, many errors were made in planning the experiments and in interpreting the results. Some points which should be noted and studied are the following: (a) Weighted results are often given without giving the methods of deriving these or the original values. (b) If four-year overlapping averages were used it would tend to smooth the yield curves and make it easier to compare the records of different plots. (c) the cultural treatment of the orchard is not always given. (d) A strip of sod in the tree rows of cultivated orchards should be noted. (e) The contour of the land is not always given. (f) Not only should checks be repeated, but often the different treatments. (g) Soil variations should be recorded. (h) Cross-feeding should be prevented or acknowledged. (i) The performance of a single element cannot always be determined by subtracting the performance of a two-element plot from a three-element one. (j) There is a big variation in individual-tree performance. (k) We must not make too wide an application of a single fertilizer experiment even in the same country. (l) To find out how much variation there is between plots, without any fer-

tilizer treatments, it would be well to keep yield records for two or, even better, three years on the different plots before applying the fertilizer. It is stated that the partial failure of some of the early experiments should not discourage the continuance of such a fundamental line of investigation, and that pomological research will be improved by the passing out of the old types of fertilizer experiment.—*E. C. Auchter.*

954. AUCHTER, E. C. Some influences of thinning, pollination, and fruit spur growth on the yearly performance record of fruit spurs and on the size of fruit produced. *Proc. Amer. Soc. Hort. Sci.* 16: 118-131. (1919) 1920.—Investigations in apple thinning, pollination, and fruit-spur growth were carried on from 1912 to 1919, inclusive, at the West Virginia Experiment Station. Results of the studies were as follows: (1) Apple-thinning experiments, carried on from 1912 to 1919, inclusive, show that neither the tree as a whole nor the individual fruit spurs are influenced by the removal of part of the crop so that the tree or spurs bloom again the following season. Fruit thinning, then, does not affect the annual bearing of apple trees.—(2) The size of the individual specimens left on the tree after thinning is greatly increased during the same year as a result of the removal by thinning of part of the crop. More marketable fruit is produced by the thinned trees and increased size of each apple in cases where the trees are bearing a good crop of fruit. This influence on size is lessened or lost altogether when trees are bearing light crops.—(3) The spurs on certain varieties of apples bloom more regularly than those of other varieties, but this does not mean that such spurs and varieties bear more regularly. A more likely explanation, with reference to fruit spurs only, of why certain varieties are annual bearers, is given in Nos. 7 and 8.—(4) Spurs which set fruit one year, generally do not blossom the next year.—(5) Spurs which blossom one year but do not set fruit, often blossom the next year. Others do not however.—(6) These results indicate for the varieties studied that the spurs, which blossom two years in succession make a greater yearly growth, have more leaves and a greater total leaf area in the year preceding the second successive blooming year. Such spurs have a greater total length and thus all indications show that they are more vigorous. Thus growth and vigor to a certain degree do not oppose, but rather encourage, fruitfulness.—(7) These results indicate that a variety is not an annual bearer because the same spurs bear in succession. They indicate that either a certain percentage of the total spurs on such varieties do not bloom in the heavy crop year and thus such spurs bloom and set fruit in the next year, or if all the spurs do bloom, a certain percentage of the spurs do not set and thus more readily bloom and set the next year.—(8) These results suggest that probably a larger proportion of the spurs on the biennial bearers not only bloom, but also set fruit in the crop year. Such spurs then do not readily bloom the next year. Observation shows that trees bearing heavy crops make very little spur growth during such years. We would expect then from No. 6 that very few spurs on such trees would bloom the following year. If greater spur growth was secured on the annual bearing varieties, then, a greater proportion of spurs would bloom in the off year, especially the non-blooming spurs of the year before.—(9) Certain varieties which produce fruit yearly, form fruit buds terminally and laterally on one year old growths to such an extent that the production of fruit from these sources is often enough to class a variety as an annual bearer without reference to its fruit spurs. It is also possible that some varieties produce a higher percentage of fruit spurs yearly than do others, and as these gradually form fruit buds, some annual fruit may be produced. However, there are many so-called annual bearers that do not produce fruit by any of these methods and a more reasonable explanation of their annual bearing is given in Nos. 7 and 8.—(10) If the statements under Nos. 7 and 8 finally prove to be justified in later work, then the whole problem of biennial and annual bearing appears to be affected to a degree by the sterility and pollination problem and is not one of growth and nutrition only.—(11) It may be possible to break up the biennial bearing of certain varieties of apples either by altering certain cultural, fertilizer, or pruning methods as suggested by different investigators, and after seeing what light certain pollination studies may throw on the problem, but at this time, we have no definite information to offer on this point, based upon investigational work of this station.—(12) There appears to be a good correlation between the weight of the indi-

vidual apples produced on a tree and the weight on seeds in each fruit. Since the number of good seeds and weight of seeds are correlated, this correlation would probably hold between weight of fruit and number of good seeds.—(13) Weather, including temperature, wind, sunshine, etc., exerts a marked influence, through its effect on the length of the blooming period, light and bee activity, on the number of good seeds and the weight of seeds in individual apples on a tree. More good seeds and a greater weight are produced in warm sunny seasons when the pistils are more receptive and the bees can work longer and more effectively.—(14) With the same crops per tree and the same cultural practices, thus keeping good vigorous spurs, the size of the individual apples of a tree should be larger in those seasons which have good weather at pollination time.—(15) If the crops per tree are much larger in certain seasons than others, then the fruit will not be larger, even though there are more good seeds and a greater weight of seeds. The correlation between weight of seeds and weight of individual apples will hold true, however, in each of the separate years.—*E. C. Auchter.*

955. BALME, JUAN. *El frambueso y su cultivo.* [The raspberry and its culture.] Rev. Agric. [Mexico] 5: 120-123. 1 fig. 1919.—A popular account of the cultivation of the raspberry in Mexico, including varieties recommended and uses of the fruit.—*John A. Stevenson.*

956. BECKWITH, CHARLES S. The effect of fertilizers on blueberries. Soil Sci. 10: 309-313. Pl. 1. 1920.—Field experiments are reported, indicating that the use of fertilizers increases the yield of blueberries. With 170 pounds of sodium nitrate, 230 pounds of dried blood, 340 pounds of steamed bone, 340 pounds of phosphate rock, and 170 pounds of Nebraska potash per acre, the yield was tripled.—*W. J. Robbins.*

957. BRIERLEY, W. G. Comparison of fall, winter and spring pruning of apple trees in Minnesota. Proc. Amer. Soc. Hort. Sci. 16: 102-104 (1919) 1920.—Experiments were conducted in Minnesota to see what the effect would be of pruning apple trees during the different months of the fall, winter, and early summer. The author concludes as follows: "The conclusions to be drawn from these observations are that pruning in fall or winter in Minnesota is not detrimental to tree vigor, maturity of shoots, hardness of growth or wound healing, and that the tips of shoots pruned in the fall and winter do not die back more than the tips of shoots pruned at other times. Apparently the apple grower in Minnesota can prune at a time most convenient for him, just as the growers in the East, South and West are doing."—*E. C. Auchter.*

958. CHANDLER, W. H. Some results as to the response of fruit trees to pruning. Proc. Amer. Soc. Hort. Sci. 16: 88-101. (1919) 1920.—A progress report is given of the pruning experiments now being carried on at the Cornell University Experiment Station. The general purpose of the experiment, as given, is to test systems of training for some of the different fruits. In addition to merely keeping fruit yields and top growth, other data are being taken, in order to find out if possible the fundamental activities that determine yield or top growth.—Attention is drawn to the fact that the response of a tree to dormant or early summer pruning is an appearance of greater vigor. The leaves are larger and greener, and the twigs continue length growth later into the season. The general opinion is that this increased vigor is explained by the fact that a reduced number of growing points and a reduced cambial area make use of the reserve food supply of the tree. The author gives tables to show the pounds of dry weight, pounds of starch, and pounds of saccharose in the one-year twigs, older branches, trunk, large roots, and small roots of a seven-year-old Bismarck apple tree. The total amount of starch in the one-year twigs was relatively small, and if all the twigs were removed, the reduction in total carbohydrates for the tree would be small. Yet if all the twigs were pruned off, a greatly increased vigor would result. Although there would be a slight increase in carbohydrate supply for the opening buds, after pruning, still, the author states, it does not seem probable that this slight increase in reserve carbohydrate supply could account for the increase in vigor of twig growth, for this reserve, according to PRICE, is quickly exhausted. PRICE shows that practically all the starch disappears

from the live tissue above ground in about eighteen days after the leaves open, and CHANDLER shows that the soluble carbohydrates decrease greatly as growth begins. He states that pruning on June 1 resulted in increased vigor, even though the reserve carbohydrate supply must have been nearly exhausted. It is shown that pruning reduces the leaf surface, and thus by reducing transpiration, the demand for water from the roots is reduced. By reducing the number of growing points and the amount of cambial area, it should reduce the demand for mineral nutrients. The author states, "It would seem probable then that the increased vigor of top growth would continue until the reduced size of the tree would be balanced by a reduction in root growth due to the reduction in leaf surface. Thus pruning would be a dwarfing process. Experiments and tables are included to show that different branches on the same tree cannot be used in pruning experiments, because the one pruned branch would not have a fair chance or would not get the same amount of water, from the roots, due to the reduced leaf area, if the other branches were unpruned. This tends to explain the ease with which one branch on a tree is suppressed as compared with the others by pruning.—The effect of pruning on nursery trees was studied as was also the effect of nitrogen on newly planted peach trees. Tables were included to show the effect of the pruning, necessary to secure an open head, on the leaf surface of the trees.—An experiment was also carried on in 1919 to test the influence of summer pruning.—E. C. Auchter.

959. CHEVALIER, AUG. *Recherches sur les poiriers, noyers, châtaigniers des parties froides de l'Indo-Chine et du Sud de la Chine.* [Research on pears, walnuts, and chestnuts in the colder regions of Indo-China and southern China.] *Compt. Rend. Acad. Sci. Paris* 170: 1335-1336. 1920.—The following species are reported as wild: *Pirus Pashia*, *Pirus granulosa*, *Juglans sagillata*, and *Castanea Duclouxii*. The cultivated forms are *Pirus communis* and *P. Simonii* and *Juglans duclouxiana*.—C. H. Farr.

960. COLLISON, R. C. A progress report of fertilizer experiments with fruits. New York Agric. Exp. Sta. [Geneva] Bull. 477. 53 p. 1920.—Experiments were conducted with apples in a nursery and in orchards, with cherries and pears in orchards, and with grapes in a vineyard. In Baldwin apple orchards the results as regards growth and yield were erratic. The growth of Spy apple trees in the orchard was generally increased by fertilizers, but not consistently. There was no significant difference in color or size of fruit. The growth of apple trees in the nursery was increased by the application of fertilizers containing potassium and phosphorus, but nitrate of soda was without effect. The growth and yield of cherry trees was increased by the use of fertilizers, and there were indications that the supply of available nitrogen may be a factor of some importance in vineyards. The author concludes that, in positive results, the experiments up to date have been very disappointing. Evidently, the effects of other factors operative in the experiments have masked any results of a positive nature which may have been due to the fertilizers applied.—F. C. Stewart.

961. CUNNINGHAM, G. H. Mortality among stone fruit trees in Central Otago. New Zealand Jour. Agric. 20: 359-364. 1920.—Excess of water is the cause of much injury in irrigated orchards. Stone-fruit trees are more susceptible than apples to such injury. Many orchards are set in soil which is too alkaline for fruit trees. *Valsa Leucostoma*, and *Nectria cinnabarina* were found as weakling parasites in some instances.—N. J. Giddings.

962. DEARING, CHARLES. The muscadine grapes—their culture and uses. *Proc. Amer. Pomol. Soc.* 1917: 52-59. 6 pl., 19 fig. 1918.—Attention is drawn to the fact that the muscadine grapes were the first native American grapes to be brought under cultivation in this country and that the Scuppermong is the oldest named native, cultivated grape. The muscadine grapes are grown mainly in the southeast. After having briefly given the early history of the development of the muscadine grape industry, the author explained the investigational work with muscadine grapes of the United States Department of Agriculture.—A general field survey was first made to gather accurate information concerning the existing industry, and cultural experiments were started. These tests showed that (a) it is better to propa-

gate by cuttings than by layers; (b) nitrogenous fertilizer was beneficial, especially for young vines; (c) it is advantageous to practice regular plowing and harrowing; and (d) proper pruning is not only desirable but actually essential.—Pollination studies showed that the varieties were practically self-sterile and that male vines and bees were necessary for cross pollination. This question is now losing its importance, since the breeding work of the department has produced a new race of muscadine grape varieties which are perfect flowered and self-fertile.—Extensive experiments have been carried on to demonstrate the value of muscadine-grape by-products, and several have been originated.—The author summarizes his work as follows: "With the development of better cultural methods, greater and more varied utilization and the production through plant breeding of new and improved varieties, the Muscadine Grape industry seems to offer great promise of filling in the future a far more important rôle in American viticulture than it has in the past."—*E. C. Auchter*.

963. DEHN, W. M., AND M. C. TAYLOR. A chemical method for the detection in fruit of a prior frozen condition. *Jour. Indust. Eng. Chem.* 12: 977. 1920.—The method is based upon the fact that in the freezing of fruits the sucrose concentration is decreased, with an increase in the concentration of invert sugar.—*Henry Schmitz*.

964. DUNLAP, H. C. The California prune and apricot growers. *Monthly Bull. California State Commission Hort.* 8: 401-403. 1919.

965. ELLENWOOD, C. W., AND PAUL THAYER. Thinning of apples, peaches and plums. *Monthly Bull. Ohio Agric. Exp. Sta.* 5⁵: 136-140. 1920.—A brief discussion is given, including reasons for thinning and the time when the practice can be followed to the greatest advantage. General suggestions for thinning are given.—*R. C. Thomas*.

966. EVANS, H. H. Report of district field inspector, Vernon. *British Columbia 14th Ann. Rept. Dept. Agric.* 1919: 24-25. 1920.

967. EVANS, H. H. Soil-fertility and crop production. *Agric. Jour.* [British Columbia] 4: 53. 1919.

968. FISHER, HUGO. Pflanzenwuchs und Kohlensäure. [Plant growth and carbonic acid.] *Naturwissenschaften* 8: 413-417. 1920.—See Bot. Absts., Entry 1301.

969. FORTIER, S. Relation to orchard irrigation practice. *Monthly Bull. California State Commission Hort.* 7: 361-367. 1919.—See Bot. Absts. 7, Entry 1392.

970. GINARTE, BENJAMIN MUÑOZ. Consideraciones sobre el cultivo de la piña en Cuba. [Cultivation of the pineapple in Cuba.] *Estac. Exp. Agron. Cuba Bol.* 45: 1-43. 16 fig. 1919.—The writer discusses the cultivation of the pineapple in Cuba under the following heads: botanical classification, varieties, soils adapted to the culture, planting systems, propagation, time of planting, cultivation, fertilization, picking, packing, pests, yields and returns, and uses of the fruit.—*John A. Stevenson*.

971. GOJÓN, CARLOS. Trabajos ejecutados en la estacion agricola experimental para frutas tropicales, Cordoba. [Work of the experiment station for tropical fruits at Cordoba, Mexico.] *Rev. Agric. [Mexico]* 5: 109-112. 2 fig. 1919. A report of plantings made of varieties of *Citrus Mangifera indica*, *Vitis*, and other tropical fruits.—*John A. Stevenson*.

972. GRABHAM, MICHAEL. The alligator pear. *Nature* 105: 517-518. 1920.—Note on cultivation of *Persea gratissima* in Madeira, where it is now in general cultivation for ornament and fruit. From seed, the trees bear in seven to ten years, reaching full maturity in twenty.—*O. A. Stevens*.

973. GRANT, J. A. **Grading and packing fruit for market.** Agric. Jour. [British Columbia] 4: 358-359. 1919.

974. GREEN, W. J., PAUL THAYER, AND J. B. KEIL. **Apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. 5¹⁰: 270-271. 1920.—A discussion is given of the varietal characteristics and bearing habits of the Yellow Transparent which render it suitable for culture in Ohio.—R. C. Thomas.

975. GREEN, W. J., PAUL THAYER, AND J. B. KEIL. **Varieties of apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. 5⁶: 180-186. 1920.—This is a discussion of the relative merits of the Baldwin, Ben Davis, and Northern Spy varieties for Ohio culture.—R. C. Thomas.

976. HEDRICK, U. P. **European grapes in eastern America.** Proc. Amer. Pomol. Soc. 1917: 46-52. 1 pl., 1 fig. 1918.—A general account of the results of investigations at the New York (Geneva) experiment station with *Vitis Vinifera* is given. In 1911 cuttings of one hundred and one varieties of European grapes were obtained by the experiment station and cleft-grafted below ground onto several different species of *Vitis*. During the seven following years, several unfavorable seasons were encountered. The grapes passed through several very severe winters and some unusually hot, dry summers. The author states, "These test seasons have proved that European grapes will endure our (New York) climate as well as the native varieties except in the matter of cold,—they must have winter protection." Two methods of winter protection were used; some vines were covered with earth while others were wrapped with straw. The earth cover proved to be cheaper and more efficient. The vines are laid down and covered with a few inches of earth. Special pruning practices are necessary, due to the necessity of laying the vines down in winter, and a practical system is explained. The growing of European grapes is encouraged, and a list of good table-varieties is given. The author finally suggests that much more experimental evidence and information concerning the growing of European grapes in this country is needed, and exhorts different investigators to carry on experiments in this field.—E. C. Auchter.

977. HEINICKE, ARTHUR J. **Concerning the shedding of flowers and fruits and other abscission phenomena in apples and pears.** Proc. Amer. Soc. Hortic. Sci. 16: 76-83. 1920.—Studies made of the shedding of leaves, fruit, petals, etc., showed that such abscission was due to the behavior of living cells near the base or at the node of the organ doomed to fall. In flowers and fruits, which were allowed to abscise in a humid atmosphere, a band of glistening tissue appeared around the base of the pedicel one to three days before abscission occurred. This band was the rim of a plate of cells that lie between the pedicel and cluster base. Just prior to separation, the walls of two to six tiers of cells on the abscission region gave a red color when treated with hydreholoric acid, thus indicating that lignification had occurred. Tests for reducing sugars showed a heavy but non-localized brick-red precipitate both before and during the abscission process. Tests for nitrates showed no localization with reference to the separation region. The same was true of iron compounds. Catalase activity was especially marked in the separation zone.—Fruits doomed to fall, especially in cool, humid weather, did not gain in size as rapidly as the others. They appeared to be more matured, showing more of the normal color, and the flesh appeared and smelled more like ripe tissue. Fruits which fell did not appear to have as high a sap concentration as shown by depression of freezing point.—Flowers or young fruit injured by cold usually fall. Flowers are often similarly influenced by nutritional conditions, as was shown by some nitrate and sugar studies. Flowers with short stems did not set so well as those having longer stems. When the fleshy portion of the fruit was removed, the stem abscised. Flowers exposed to illuminating gas fell off, and when fruit was coated with grafting wax, abscission generally followed. It was suggested that severe root pruning in early spring might be a factor in the abscission of immature fruits.—Water forced or pulled through twigs, spurs, etc., seemed to check abscission. Nitrogen in the tissues appeared to be an important factor in delaying leaf fall. This was shown practically when certain apple trees which had received an appli-

cation of nitrate of soda held their leaves much later in the fall than similar trees which had received no nitrate. When excised spurs with fruit were immersed in water, abscission did not occur.—The author concludes as follows: "The facts here presented and those recorded in the literature are not sufficient to afford an entirely satisfactory explanation of the behavior of the cells in the abscission zone. Undoubtedly, the causes that stimulate or excite the peculiar changes in this region are associated with variations in nutrition and water supply. If the tissues above the plane in which separation may occur is abundantly supplied with water and other substances that counteract maturity or favor translocation or utilization of assimilated material, conditions apparently are not favorable for manifestation of the meristematic nature of cells in the potential abscission zone. In many fruits effective fertilization helps to bring about these desirable conditions, but it should be remembered that development of seeds is only one of several possible means of causing a set. Self fruitfulness may be associated with the fact that the cells at the base of the pedicels of flowers on such varieties are not as easily stimulated into abscission activity as similar cells of self-barren trees."—*E. C. Auchter.*

978. HIGGINS, J. E. **The litchi—*Litchi chinensis*.** Proc. Amer. Pomol. Soc. 1917: 59–66. 1918.—This paper gives a general discussion concerning our present knowledge of the litchi. A brief history of its origin and present distribution is included. Its cultural and fertilizer requirements are stated, and methods of propagation are discussed. In general, the trees do best on a deep, moist, alluvial soil and respond well to heavy applications of various manures. Air-layering is generally used as a means of propagation. A few trees are now growing in California and Florida, but the bulk of the crop is produced in southern China, India, Ceylon, and other parts of the Orient. Trees of the litchi are also found in Japan, Formosa, Australia, Hawaii, Mauritius, Brazil, and the West Indies. The fresh fruit is eaten in these countries, where the trees grow, but the dried litchi nut is the product generally found in our markets.—*E. C. Auchter.*

979. HOY, B. **Report of district horticulturist and inspector of fruit pests, Okanagan Valley.** British Columbia 14th Ann. Rept. Dept. Agric. 1919: 20–24. 1920.

980. HUNTER, W. T. **Report of district field inspector, southern Okanagan, Similkameen and boundary districts.** British Columbia 14th Ann. Rept. Dept. Agric. 1919: 22–24. 1920.

981. HUMMANN, GEORGE C. **Growing currant grapes.—A promising new industry for this country.** Proc. Amer. Pomol. Soc. 1917: 66–69. 4 pl., 5 fig. 1918.—Currant grapes were grown extensively in France until the Phylloxera destroyed the vineyards. At this time the plantings were greatly increased in Greece and were very profitable until the re-establishment of the French vineyards on Phylloxera-resistant grape stocks introduced from the United States.—The U. S. Department of Agriculture has demonstrated that these currant grapes can be profitably grown in this country. These grapes are among the earliest to ripen, and the crop can be dried and put away before the earliest rains occur in districts where other raisin varieties are too late in ripening.—Currant grapes were introduced into California in 1861. In 1901, DAVID FAIRCHILD introduced the Panariti variety from Greece. This proved to be greatly superior to the other varieties. When grafted on Phylloxera-resistant stock and stock suited to the soil and climate under which it is grown, it has proven extremely fruitful and profitable in California, Arizona, and southern Nevada. The author states, "It has been ascertained that to make the blossoms set and secure a full crop of fruit, the vines must be incised." This should be done while the vines are in blossom. When vines are planted eight by eight feet apart, they will yield an average of 10½ tons, or conservatively from two to five tons, of dried currents to the acre.—*E. C. Auchter.*

982. KAINS, M. G. **Home fruits as educators of public taste.** Proc. Amer. Pomol. Soc. 1917: 94–98. 1918.—Attention is drawn to the fact that in many of our large commercial orchards, varieties of fruit, often with only fair or even poor quality, are planted. It is shown that in the older home orchards or small fruit plantations, only fruits of the highest quali-

ties were planted. This tended to create a love of and demand for more fruit. The noted early pomologists were mostly amateurs, who loved good fruit. The statement is made that many of our fruit specialists of to-day were probably reared on farms, which had excellent home fruit plantations of high quality. The importance of replacing decrepit or old home orchards with fruits of the highest quality as well as the establishment of such new plantations on all farms is emphasized. It is suggested that such plantations will train future fruit lovers and specialists among the rising generation, and thereby home fruits will naturally continue, as in the past, to be educators of public taste.—*E. C. Auchter.*

983. LYNE, W. H. **Horticultural quarantine** in B. C. Agric. Jour. [British Columbia] 4: 132-133. 1919.—This is an address given by Mr. LYNE at the Interstate Plant Quarantine Conference, Riverside, California in May, 1919.—*J. M. Eastham.*

984. LYNE, W. H. **Report of chief inspector of imported fruit and nursery stock.** British Columbia 14th Ann. Rept. Dept. Agric. 1919: 45-49. 1920.

985. MACOUN, W. T. **Apple breeding in Canada.** Proc. Amer. Pomol. Soc. 1917: 11-27. 1 *pl.*, 1 *fig.* 1918.—A great deal of the apple-breeding work in Canada has been done at the Central Exp. Farm, Ottawa, Ontario, although considerable work has been done at the Ontario Agric. Coll. Guelph, Ontario, and at the Hortic. Exp. Sta. at Vineland, Ontario. At the Central Exp. Farm an orchard of about 3000 trees grown from seed imported from Russia, was planted in 1890. These started to fruit in 1897 and were mostly summer apples. Only a few, such as Claire, Neville, Oscar, Percival, Roslin and Rupert, were considered sufficiently promising to propagate.—In 1898, seeds were saved from a variety orchard; and seedlings, about 2000 in all, were grown. During the past 14 years, 1211 of the seedlings fruited. Three hundred and seventy-eight were considered promising enough to propagate, and 99 of the best were named. It was noted that the seedlings resembled their female parent in many particulars. A brief description of the seedlings originated from different varieties is given by the author. A descriptive table of the various seedlings is included, also a table giving the names of the named seedlings and such information as female parent, date of sowing seed, date of planting tree, date of first fruiting, etc.—A brief record of the early work of Wm. SAUNDERS was given. In 1887 seeds of the "Berried Crab," *Pyrus baccata*, obtained from Russia were planted. The resulting seedlings proved very hardy. In 1894, many of the hardiest and best sorts of apples grown in Ontario were crossed on *Pyrus baccata* with the hope of improving the size and quality of fruit. In 1896 similar crosses were made on *P. prunifolia*, and in 1902 on *P. Malus*. Many of the best of the crosses have been recrossed, thus introducing a second portion of the characteristics of the larger apple. Many of Dr. SAUNDERS' hybrids have proved harder than any other varieties of apples or crab apples tested and are much larger than the original crabs.—The author states that it is important to obtain apples suitable for the prairie provinces of Canada as soon as possible. In 1910 seed from some of the hardiest Russian apples were sown. Many seedlings have been obtained, and it is hoped to secure valuable hardy sorts.—Some cross breeding has been done yearly since 1895, and, as a result, about 1000 trees are now growing. So far, not many apples that have fruited were thought worthy of propagation, but there were a few promising ones in the McIntosh-Lawver crosses where the object was to obtain varieties which would keep better than McIntosh. Following are those which have been named: Lawver × McIntosh, Holz, Vermac; McIntosh × Lawver, Mavis, Rustler.—*E. C. Auchter.*

986. MANARESI, ANGELO. **Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29 e 30 marzo 1918.** [Damage to flowers of fruit trees by spring frosts and in particular the frosts of the 28, 29 and 30 of March 1918.] Rev. Patol. Veg. 10: 1-26. 1919.—At the time of these frosts the flowers of almonds and apricots had lost their petals, peaches were in full bloom, cherry blossoms were opening, and the floral buds of the plum, pear, and apple were swelling. In the almond and peach it was noted that many stigmas, styles, and ovaries turned brown and dried. The stamens were little injured. The pollen of several varieties of peaches germinated as well after as

before the frosts. The same pollen in maltose solution subjected to a temperature of -8°C . germinated very little. A temperature of -2.5°C . reduced the germination about half.—Notes are given on the relative amount of injury to different varieties of peaches and cherries, and tables show the same for pears and apples. The greatest injury was suffered by the almonds, and then in order of decreasing injury came peaches, pears, plums, apples, and cherries. Bibliography is appended.—*F. M. Blodgett*.

987. MATONS, AUGUST. *La poda de l'olivera*. [Pruning of the olive.] *Rev. Inst. Agric. Catalan de San Isidro* 69: 22-24, 37-38. 1920.

988. MATTHEWS, C. D. Report of the division of horticulture, North Carolina Agric. Exp. Sta. Ann. Rept. 42: 59-64. 1920.—A statement concerning the subject matter of investigations in progress, including tests on dehorning of peach trees and hardiness of peach varieties, variety testing, breeding, and top working of pecans, cultural practices with strawberries, and variety testing, storage, and selection of sweet potatoes.—*F. A. Wolf*.

989. MEEK, B. B. Oranges for Thanksgiving. *Monthly Bull. California State Commission Hort.* 8: 367-370. 1919.

990. MOORE, J. G. Scion root production by apple trees in the nursery. *Proc. Amer. Soc. Hortic. Sci.* 16: 84-88. (1919) 1920.—Studies were made at the Wisconsin experiment station concerning the possibility of producing apple trees on their own roots through using long scions in root grafting and planting such grafts deep in the nursery row. There were found to be wide differences in the ability of different varieties to produce scion roots. Although there was fluctuation from year to year in the relative percentages of trees of given varieties which produce roots, still for the most part the relative ability held fairly constant. A table of eighteen varieties showing the percentage of trees which rooted each year during the years 1914 to 1918, is included. It was found that with most varieties, even after three years in the nursery, the number of trees having sufficient scion roots to support themselves was very small. A table is included which shows that a higher percentage of grafts produce strong scion roots when grown in moist soil than when grown in dry soil. Groups of trees were planted at varying depths of from two to six inches. While there were some instances in which deeper planted grafts did not produce scion roots as well as the shallower ones, still, for the most part, the increase in root production was in proportion to the depth of planting. It was suggested that this was true because there was more soil moisture surrounding the basal portion of the deeper planted scions. The author states that two-year-old trees did not, under ordinary nursery conditions, possess sufficient roots to sustain themselves if the stock roots were removed. He also states, "It is clearly evident that if a large proportion of apple trees purchased by fruit growers are to possess at the time of planting scion roots sufficient to support them, it will be necessary to devise some new methods of propagation. Doubtless many of the long scion trees, which show few or no roots at planting in the orchard, develop them within two or three years after planting. However, if this is not so, then the additional care and expense in propagating trees from long scion grafts as now practised is largely wasted."—*E. C. Auchter*.

991. MUNSON, K. W. Grafting the fruit-tree. *Agric. Jour.* [British Columbia] 4: 49. 1919.

992. MUNSON, K. W. Intensive fruit-culture in Fraser Valley. *Agric. Jour.* [British Columbia] 4: 104. 1919.

993. MUNSON, K. W. Pruning the balanced fruit-tree. *Agric. Jour.* [British Columbia] 4: 14-15. 1919.

994. PACHANO, ABELARDO. El mildew de la viña. [Downy mildew of the grape.] *Quinta Norma. Estac. Exp. Circ.* 9. 22 \times 15 cm., 8 p. Ambato, 1918.—See Bot. Absts. 7, Entry 1198.

995. PARTRIDGE, N. L. **Growth and yield in apple trees.** Proc. Amer. Soc. Hortic. Sci. 16: 104-109. (1919) 1920.—Studies made at the Delaware experiment station on the growth and yield, during the previous three years of ten-year-old Jonathan, Yellow Transparent, and Stayman Winesap apples, indicated strongly that there was a very consistent relationship between the growth that the tree made and the amount of fruit produced. It was shown that if the growth was smaller in 1918 than in 1917, the yield was larger in 1918; and the reverse was also true. Thus the author states, "There is an alternate habit of growth as well as an alternate habit of bearing in these trees. However in the case of the tree with an increasing yield this is not the case." It was suggested, however, that when trees with increasing yields finally had sufficient fruit produced in some year to depress the growth, such trees would then fall in the biennial habit of bearing and growth.—*E. C. Auchter.*

996. PIERCE, G. W. **The almond industry.** Monthly Bull. California State Commission Hort. 8: 355-357. 1919.

997. POPENOE, WILSON. **The natural groups of mangos cultivated in Florida.** Proc. Amer. Pomol. Soc. 1917: 70-81. 5 pl., 5 fig. 1918.—The varieties of mangos now grown in Florida have been classified by the author into a natural classification. The different varieties which resemble one another in certain general characters have been placed in groups according to these natural resemblances. In defining the groups, consideration was given to characters of growth, foliage, inflorescence, fruiting habits, and the fruit itself.—Two main divisions of the several groups are first made; namely, (1) bark rough; leaves having commonly 18 to 24 pair of primary transverse veins; and (2) bark smooth; leaves having commonly 26 to 30 pairs of primary transverse veins.—In the first division are included the following groups: Mulgoba, Alphonse, Sandersha, Madras, and Julie groups.—In the second division is included the one group—Cambodiana.—Detailed descriptions of each group are given in the paper, and the varieties which fall in each group are enumerated.—*E. C. Auchter.*

998. RICE, W. H. **Orchard sanitation.** New Zealand Jour. Agric. 20: 238-242. 1920.—A general discussion showing the importance of sunlight, air circulation, drainage, cultivation, and general cleanliness in orchard practices.—*N. J. Giddings.*

999. ROBERTS, R. H. **Studies in biennial fruiting.** Proc. Amer. Pomol. Soc. 1919: 28-33. 1918.—Careful studies were made at the Wisconsin experiment station concerning the biennial fruiting of certain apple varieties. The effects of blossom formation, spur growths, and leaf areas during one year on the amount of bloom the following year were noted. The author's general conclusions are as follows: "While no definite solution of the off-year question is attempted, two statements bearing upon this matter can be made as a result of the investigations.—(1) Biennial blossoming and fruiting is not due to a constitutional habit of the tree. If it were due to a definite plant habit, successive blossoming could not have been induced by blossom removal. Investigations with other plants show that blossom-bud production is associated with the amount of plant-foods present. Qualitative tests indicate the same condition in the apple. The off year, then, evidently results from a condition of nutrition within the plant and not from a growth habit.—(2) Annual bearing by successive blossoming of individual spurs cannot be expected. When the spur produces blossoms and develops them to the point of setting fruit, it seldom blossoms again the next year. The development of blossoms to the stage at which the fruit can be said to have set together with the presence of excessive numbers of blossom spurs, seems to be the determining factor in the ability of the spur to blossom in successive seasons. If annual bearing can be produced, it must apparently be brought about by having a double system of spurs, which fruit in alternate seasons. How this may be accomplished fully cannot be stated further than to refer to the condition as pointed out before, that excess growth as well as very weak growth was associated with the failure to form blossom buds. The normal blossom spurs are usually one-eighth to one-half inch in length. If their growth is increased to one to two inches, they

usually fail to produce blossom buds. Such a change, which must come from an influence on individual spurs, would require pruning of a rather detailed nature. The influence of cultivation and soil fertility in increasing the general growth of the tree would also have a large part to play in causing an increased growth that is associated with the failure to produce an excessive number of blossoms. These factors have been shown by practice and experiment to have a marked corrective influence on biennial bearing.—Blossom bud formation is due to a condition within the plant. This condition is subject to modification by a number of external factors. In working to obtain annual bearing, it may be necessary to modify the orchard cultivation, the amounts of fertilizer applied, the available moisture content of the soil, the pruning, or various combinations of these factors.—*E. C. Auchter.*

1000. STARK, PAUL C. **The small orchard—how to make it profitable.** Proc. Amer. Pomol. Soc. 1917: 99-106. 1918.—The author shows that the small home orchard plays an important part in the nation's food supply. He compares the food value of fruits with that of meats, etc. He points out, that as a whole the returns per acre are as large if not larger from fruits as from other crops. In summarizing, he urges (1) that people plant and grow back yard fruit gardens along with their vegetable gardens, (2) that every farm have its own home orchard for home consumption and sell the surplus on the local markets; (3) that farmers be shown how to renovate their neglected orchards so that they will be the best paying part of the farm, and that they be shown how simple it is to produce first-class fruit instead of wormy culls.—*E. C. Auchter.*

1001. STEWART, JOHN P. **Fertilization of apple orchards.** Proc. Amer. Pomol. Soc. 1917: 34-45. 1 pl., 1 fig. 1918.—The results of the past nine-years' experimental work in apple orchard fertilization as carried on by the Pennsylvania experiment station is given. Similar experiments were carried on in several different orchards throughout the state. Applications of nitrogen, phosphorus, and potash, singly and in different combinations, were made in the various orchards. Tables showing the fruit yields and tree growths, as influenced by the various treatments, are given. The results in the Johnston orchard, 20 years old at the start of the experiment, and in the Brown orchard, 21 years old at the start, show that nitrogen (nitrate of soda) influenced the yields more than any of the other elements. Greater returns from the nitrogen applications seemed to result when phosphorus was also added. In younger orchards such as the Strode orchard, nitrogen increased the growth of the trees but did not materially increase the yield of fruit. In the Tyson orchard, potash seemed to give the best results. A plan for local orchard fertilizer tests is given. It is stated that the best time to apply the fertilizer, especially nitrogen, is in the early spring before the blossoms open. It should be spread over the surface of the ground beneath the spread of the limbs. It is suggested that it might be well to apply part of the nitrogen before the blossoms open and part after the fruit had set.—*E. C. Auchter.*

1002. THAYER, PAUL, J. B. KEIL, AND W. J. GREEN. **Varieties of apples adapted for Ohio culture.** Monthly Bull. Ohio Agric. Exp. Sta. 5^o: 252-255. 1920.—A discussion is given of the relative merits of the banana and ensee varieties of apples for culture in Ohio.—*R. C. Thomas.*

1003. TUFTS, W. P. **The so-called "New system of pruning."** Monthly Bull. California State Commission Hort. 8: 424-426. 1919.—The lighter the pruning, the heavier and stockier the tree becomes. By intelligent pruning during the early life of the fruit tree, it can be brought into bearing two or three years sooner than has generally been the case in California.—Author reports upon data found in Bull. 313 of the University of California.—*E. L. Overholser.*

1004. WESTER, P. J. **Vegetative propagation of tropical fruit.** Proc. Amer. Pomol. Soc. 1917: 82-94. 9 pl., 40 fig. 1918.—Attention is drawn to the fact that there are great opportunities for improvement of the tropical fruits merely by the discovery of a practical method of propagating the various species asexually. Considerable experimental work in shield

budding has been carried on by the writer with tropical fruits at the Lamao Experiment Station, Philippine Islands. Brief directions for the vegetative propagation of 110 tropical and semi-tropical fruits are given.—*E. C. Auchter*.

1005. WHITE, E. W. Report of Assistant Horticulturist and Inspector of fruit pests, Vancouver Island and Lower Mainland districts. British Columbia 14th Ann. Rept. Dept. Agric. 1919: 15-19. 1920.

1006. WHITE, E. W. The prospects in strawberries. Agric. Jour. [British Columbia] 4: 178-179. 1919.

1007. WHITE, E. W. The queen of fruits. Agric. Jour. [British Columbia] 4: 47. 1919.—A popular article on strawberry growing in British Columbia.—*J. W. Eastham*.

1008. WHITTEN, J. C. The relation of experiment station work to practical fruit growing. Monthly Bull. California State Commission Hort. 8: 421-423. 1919.—The detail study of the fruit tree, its structure, composition and nutrition, and the influence of heat, cold, etc., has revealed the fruit tree as a living, plastic, shapable thing, which has a very sensitive response to the various stimuli of its environment. The revelation has completely revolutionized the old systems of pruning.—*E. L. Overholser*.

1009. YEAGER, A. F. Horticulture. North Dakota Agric. Coll. Ext. Circ. 40: 13-16. 1920.—Discusses trees, shrubs, fruits, and vegetables for the state.—*L. R. Waldron*.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1010. ANONYMOUS. Alpine plants for rock-gardens. [Rev. of: FARRER, R. The English rock-garden. Vol. 1. XIV + 504 p., 52 pl. Vol. 2. VIII + 554 p., 50 pl. T. C. and E. C. Jack: London and Edinburgh, 1919.] Nature 104: 664-666. 1 fig. 1920.—Reviewer finds it "a real compendium of sound information and learning, though unduly biased in certain respects" and burdened with superfluous language.—*O. A. Stevens*.

1011. ANONYMOUS. Aquarium exhibit. Missouri Bot. Gard. Bull. 7: 63-67. 1919.—A list of thirty plants suitable for aquaria.—*O. T. Wilson*.

1012. ANONYMOUS. Native plants suitable for the gardens of Missouri and adjoining states. Missouri Bot. Gard. Bull. 8: 35-46, 52-59, 63-67, 69-77, 85-94, 104-110. 1920.—Shrubs and other plants are listed as follows: plants suitable for rock gardens; hardy native plants for the water garden and native vines and climbing plants; native trees and shrubs with conspicuous flowers; native perennials for the hardy border; native perennials for natural and wild gardens, and hardy native ferns and plants of similar culture; native shrubs for mass planting (flowers inconspicuous); native trees and shrubs with brightly colored foliage in autumn and conspicuous fruit and bark in autumn and winter, and native evergreen trees and shrubs.—*O. T. Wilson*.

1013. ANONYMOUS. Commercial mushroom cultivation. Jour. Ministry Agric. Great Britain 27: 678-680. 1920.

1014. BALFOUR, F. R. S. Rhododendron at Dawyck Stobo, Tweed-Dale. Rhododendron Soc. Notes 1: 223-224. 1920.—The hardiness of many species is recorded.—*Alfred Rehder*.

1015. BALFOUR, I. BAILEY. Some large leaved Rhododendrons. Rhododendron Soc. Notes 1: 204-222. 1920.

1016. BEAN, W. J. The Fortunei group of Rhododendrons. Rhododendron Soc. Notes 1: 187-194. 1919.

1017. DOMINGUEZ, IGNACIO. *El cultivo de las plantas florales ornamentales.* [Cultivation of ornamental plants.] *Rev. Agric. [Mexico]* 5: 208-218. 16 fig. 1919.—Outlines methods of propagating ornamentals in general.—*John A. Stevenson.*

1018. HOPKINS, S. H. A sweet-pea farm on V[ancouver] I[land]. *Agric. Jour. [British Columbia]* 4: 238. 1919.

1019. LODER, EDMUND GILES. List of *Rhododendron* species growing at Leonardslee, near Horsham, Sussex, September, 1918. *Rhododendron Soc. Notes* 1: 197-200. 1919.—A list of about 200 species and a few varieties, with introductory notes on the nomenclature of some species.—*Alfred Rehder.*

1020. MAGOR, E. J. P. Notes from Lamellan Garden, 1919. *Rhododendron Soc. Notes.* 1: 229-231. 1920.—The flowers of some rare species are described, and three new hybrids mentioned.—*Alfred Rehder.*

1021. MOORE, H. ARMYTAGE. *Rhododendrons at Rowallane, Co. Down.* *Rhododendron Soc. Notes* 1: 233-235. 1920.—Notes on rare species.—*Alfred Rehder.*

1022. SECREST, EDMUND. Protection for shade trees. *Monthly Bull. Ohio Agric. Exp. Sta.* 5⁶: 163-169. 1920.—A discussion is given of the relative merits of various types of tree guards in current use, and of the importance of tree surgery.—*R. C. Thomas.*

1023. STODDARD, W. B. Alaska flower and vegetable gardens. *Seed World* 8⁶: 17-18. 1920.

1024. WILLIAMS, J. C. Some notes on the raising of *Rhododendron* seedlings. *Rhododendron Soc. Notes* 1: 237-238. 1920.

1025. WILLIAMS, P. D. Notes on Chinese *Rhododendrons* as grown in Cornwall. *Rhododendron Soc. Notes* 1: 239-240. 1920.—Chiefly notes on flowers of ornamental species.—*Alfred Rehder.*

VEGETABLE CULTURE

1026. BURDETT, JAMES H. Summary of the first season's work of the national garden bureau. *Seed World* 7¹²: 13-15. 1920.

1027. HOOD, G. W. Keeping qualities of hubbard squash. *Proc. Amer. Soc. Hortic. Sci.* 16: 186-188. (1919)-1920. Hubbard squashes were kept in storage from November 1 until last of March. The temperature of the storage room fluctuated between 40-50° F. Fourteen average-sized specimens were placed in storage two succeeding years. The average shrinkage, due primarily to water loss, was 23.18 per cent; the greatest monthly shrinkage was in March.—*H. A. Jones.*

1028. HOOD, G. W. Varietal variations as seen in similar methods of training tomatoes. *Proc. Amer. Soc. Hortic. Sci.* 16: 183-185 (1919)-1920.—Stone, June Pink, and Earliana varieties of tomatoes were handled as follows in the open field: (1) staked and pruned to one stem, (2) staked and not pruned, (3) pruned and not staked, and (4) neither staked nor pruned. All varieties produced the greatest amount of ripe fruit when the vines were neither pruned nor staked. The Stone and June Pink produced the least amount of ripe fruit when the vines were both staked and pruned, while the Earliana produced the least amount of ripe fruit when pruned and not staked. In no case did the plants that were neither pruned nor staked produce the maximum amount of green fruit at the end of the season.—*H. A. Jones.*

1029. KEIL, J. B. Cellar storage of vegetables. *Monthly Bull. Ohio Agric. Exp. Sta.* 5¹⁰: 266-269. 1920.—The farm storage cellar is the type particularly in mind. The importance of keeping the storage sanitary and of maintaining correct temperatures is pointed out.

Certain vegetables are classified according to the effect of freezing upon them. Proper storage conditions for potatoes are outlined. The importance of a spring with running water for regulating temperature and humidity is referred to.—*R. C. Thomas.*

1030. KEIL, J. B. **Home production of vegetable seeds.** *Monthly Bull. Ohio Agric. Exp. Sta.* 57: 216-219. 1920.—This is a discussion of methods of selection, improvement, care, and storage of vegetable seeds.—*R. C. Thomas.*

1031. LLOYD, J. W. **The need of vegetable investigations.** *Proc. Amer. Soc. Hortic. Sci.* 16: 171-175. (1919)-1920.—The author cites the following lines of work as being especially in need of further investigation: (1) variety nomenclature, (2) structure and composition of vegetables, (3) development of varieties tolerant of particular conditions, (4) disease resistance and disease control, (5) manure substitutes, (6) storage, and (7) the preservation of perishable produce.—*H. A. Jones.*

1032. MCCALL, F. E. **The farm and garden.** *Proc. Amer. Soc. Hortic. Sci.* 16: 188-190. (1919)-1920.—Results are given of coöperative farm-garden demonstrations carried on in South Dakota during the years 1916-1919, inclusive.—*H. A. Jones.*

1033. McMEANS, A. **Vegetable-seed growing on Pacific Coast.** *Agric. Jour. [British Columbia]* 4: 5. 1919.

1034. ROSA, J. T. **Nature of hardening in vegetable plants.** *Proc. Amer. Soc. Hortic. Sci.* 16: 190-197. (1919)-1920.—Tomato represents the group of plants that cannot be hardened to any great extent, while the cabbage and lettuce represent the group which develop hardness to a considerable degree. In hardening, cabbage becomes a lighter green and often shows some pink coloration. The amount of bloom increases; leaves become more leathery and stems more woody; there is a gradual increase in the percentage of dry weight; the area of the palisade cells decreases; and the freezing point of the sap is lowered. Carbohydrate changes accompanying hardening are also significant. There is an accumulation of sugar, but this increase is much greater in plants exposed to low temperature than in those subjected to desiccation. "There is also an increase in starch and total polysaccharids in hardened cabbage plants." Practices that slow up or check the rate of growth of cabbage, lettuce, or tomatoes induce a greater degree of hardness to cold.—*H. A. Jones.*

1035. WIRTHLE, F., AND E. RHEINBERGER. **Über Rangoonbohnen. [Lima beans.]** *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 39: 346-349. 1920.—This article deals with morphology and chemical composition of lima beans. The cyanide content of lima beans from Würzburg varied from 6.1 to 12.2 mgm. in 100 grams.—*H. G. Barbour.*

HORTICULTURE, PRODUCTS

1036. ANONYMOUS. **La harina de platano. [Banana flour.]** *Agric. Mexicano y Hogar* 36: 180-181. 1920.

1037. ANONYMOUS. **La industria italiana del aceite de pepitas de uva. [The Italian grapeseed oil industry.]** *Informacion Agric. [Madrid]* 10: 406-408. 1920.—The method of extraction is given.—*John A. Stevenson.*

1038. BAÑO, JOSE DE. **Conservacion de los racimos de uvca fresca. [Preservation of fresh grapes.]** *Rev. Agric. [Mexico]* 5: 265-267. 5 fig. 1919.—The author discusses various methods of preserving and shipping fresh grapes, by using ground cork, sawdust, or other materials.—*John A. Stevenson.*

1039. BRIERLY, W. G. **Cider- and vinegar-making qualities of Minnesota apples.** *Minnesota Agric. Exp. Sta. Bull.* 185. 23 p., 5 fig. 1920.

1040. CAMPBELL, C. H. Jelly. Jour. Indust. Eng. Chem. 12: 558-559. 1920. A method for the quantitative determination of pectin is given. Ten cc. of filtered juice is added drop by drop from a pipette, with vigorous stirring, to 180 cc. of alcohol. The solution is filtered, immediately dissolved in boiling distilled water, evaporated to dryness, heated two hours at 70°C. *in vacuo*, weighed, burnt to ash, and reweighed. The loss in weight multiplied by ten gives the percentage of pectin in the juice.—*Henry Schmitz*.

1041. KRUG, O., AND HANS FILCHNER. Die Weinerte 1919 in der Pfalz. [The 1919 yield in the Palatinate.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 153-157. 1920.

1042. KRYZ, F. Der essbare Anteil einiger westindischer Obstsorten. (Edible portion of certain West Indian fruits.) Zeitschr. Untersuch. Nahrungs-u. Genussmittel 38: 366-367. 1919.

1043. KRYZ, F. Der Gehalt der Karobenfrüchte an essbarem Anteil und Samen. [Edible portion and seed content of locust bean.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 353-355. 1920.

1044. DE MANJARIES, RAMON. Aprovechamiento de orujos y alpechines de la aceituna. [Utilization of olive bagasse.] Rev. Inst. Agric. Catalan de San Isidro 69: 261-263. 1920.—The author advises the use of the waste products remaining after the oil is extracted from the olive as fertilizers or for distillation. The material is said to yield the same products as wood, the supply of which in Spain is very limited.—*John A. Stevenson*.

1045. SCHMITT, R. Untersuchung von 1919-er Traubenmosten Frankens. [Musts of Franconia.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 198-204. 1920.

1046. SPRINKMEYER, H., AND O. GRUENERT. Über Vanillinerzeugnisse. [Vanilla products.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 145-148. 1920.—Methods of preserving aroma.—*H. G. Barbour*.

1047. WELLENSTEIN AND SEILER. Über Zuckering und Saurerückgang von Moselweinen. [Sugaring and souring of Mosel wine.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 1-30. 1920.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

1048. ANONYMOUS. [Rev. of: SMALL, JAMES. The origin and development of the Compositae. Reprint No. II from the New Phytologist. 334 p. Wesley & Son.] Jour. Botany 58: 202-204. 1920.—See Bot. Absts. 7, Entry 333.

1049. H., W. P. [Rev. of: CHURCH, A. H. On the interpretation of phenomena of phyllotaxis. Oxford Botanical Memoirs, No. 6. 58 p., 18 fig. 1920.] Jour. Botany 58: 228-230. 1920.

1050. ANONYMOUS. A university course in botany. [Rev. of: CHURCH, A. H. Botanical Memoirs. 4. Elementary notes on structural botany. 27 p. 5. Elementary notes on the reproduction of angiosperms. 24 p. Oxford Univ. Press: London, 1919.] Nature 105: 162. 1920.—See Bot. Absts. 7, Entry 717.

1051. ARBER, AGNES. On the leaf structure of certain Liliaceae, considered in relation to the phyllode theory. Ann. Botany 34: 447-465. 38 fig. 1920.—The phyllode theory of the monocotyledonous leaf is here applied in many selected cases from the Liliaceae, and the

author's interpretation of the leaf structure on the basis of that theory is given. The species studied belong for the most part to the Asphodeloideae and Alliioideae. The evidence, which is given in detail for each species studied, is considered to indicate that in different cases the leaf is morphologically (1) leaf-base phyllode, (2) petiolar phyllode, (3) chiefly leaf-base with small petiolar region, and (4) chiefly petiole with small leaf-base region.—*W. P. Thompson.*

1052. ARBER, AGNES. The vegetative morphology of *Pistia* and the Lemnaceae. *Proc. Roy. Soc. London B.* 91: 96-103. 8 fig. 1920.—*Engler's* early work on lemnaceous homology of *Pistia* is confirmed and extended. Presence of row of inverted bundles in "limb" of *Pistia* indicates that it is a petiolar phyllode, and this finding is applied to *Spirodela*, in which the inverted bundles are missing. In the latter plant, buds are borne in lateral pockets formed by ligules on either side of limb or frond. In *Pistia* the limb is fused along its median line with the rudimentary plant axis, leaving no space for axial buds; consequently buds occur at one side in recessed pockets comparable with those in *Spirodela*.—*Paul B. Sears.*

1053. BOODLE, L. A. The mode of origin and the vascular supply of the adventitious leaves of *Cyclamen*. *Ann. Botany* 34: 431-437 6 fig. 1920.—When seedling tubers of *Cyclamen* are decapitated, adventitious leaves develop usually from near the margin of the cut and occasionally from the cut surface itself. The development of these leaves and particularly of their vascular supply is described. The internal tissues of the leaf are always derived from the sub-epidermal tissues of the tuber; but the epidermis of the leaf may be either epidermal or subepidermal in origin, depending on whether periderm had previously been developed. The procambial strands develop rapidly from the leaf rudiment inwards, soon forming connections with two or three bundles of the tuber. All the cells in a transverse section of a strand are derived from a single cortical cell. No definite opinion is reached in regard to the nature of the stimulus requisite for the initiation of the leaf trace, but reference is made to *Simon's* conclusion that in somewhat analogous cases the stimulus depends on the distribution of water in the tissues.—*W. P. Thompson.*

1054. BREWSTER, A. A. Aril of *Cupania* and *Synoum*. *Australian Nat.* 4: 170. 1920.

1055. BREWSTER, A. A. *Microzamia* or burrawang. *Australian Nat.* 4: 162-164, 167, 169. Pl. 3. 1920.—A popular account of the morphology of the flower, seed, and seedling.—*T. C. Fryc.*

1056. BROWN, ELIZABETH DOROTHY WUIST. Apogamy in *Osmunda cinnamomea* and *O. Claytoniana*. *Bull. Torrey Bot. Club* 47: 339-345. 10 fig. 1920.—Only one case has previously been reported of apogamy in *Osmunda*. Descriptions are given in this paper of one case in *O. cinnamomea*, and of three in *O. Claytoniana*, but none occurred in cultures of *O. regalis*.—*P. A. Munz.*

1057. BROWN, FOREST B. H. The silicious skeleton of tracheids and fibers. *Bull. Torrey Bot. Club* 47: 407-424. 5 fig. 1920.—Secondary xylem, when it shrinks or swells, does not change in length, yet details of anatomy have not shown why one dimension of the cells concerned should vary independently of another. A study of the minute structure of the secondary thickening of the walls in fibers and tracheids of wood and in fibers of bast, shows that there is a greater mineralization in parts of this wall than in the rest. These mineralized tracts run longitudinally and form a skeletal structure going from one end of the cell to the other. These rods imbibe little or no water and allow practically no change in length, but the matrix between them, by swelling or shrinking, permits tangential or radial change in volume. The structure of the fiber wall was found to be essentially the same in some 500 species studied, the skeleton consisting of sparingly branched rods which become reticulate in the vicinity of pits or have transverse connections. These skeleton rods seem to be silicious in many cases, although there is variation in different families, genera, or even species as to composition. They can be demonstrated by partial combustion of a section on a slide, the portions along the burned margin showing small noncombustible rods.—*P. A. Munz.*

1058. BROWN, J. G. *The cycads*. [Rev. of: CHAMBERLAIN, CHARLES J. *The living cycads*. Univ. of Chicago Press: Chicago, 1919.] *Plant World* 22: 364-365. 1919.

1059. BROWNE, ISABEL M. P. *Phylogenetic considerations on the internodal vascular strands of Equisetum*. *New Phytol.* 19: 11-25. 7 fig. 1920.—See Bot. Absts. 7, Entry 1101.

1060. BUGNON, P. *Dans la tige des Graminées, certains faisceaux liberoligneux longitudinaux peuvent être des faisceaux gemmaires*. [In the stem of grasses, certain longitudinal fibrovascular bundles seem to arise from the "gemmaire" bundles.] *Compt. Rend. Acad. Sci. Paris*, 170: 1201-1203. 4 fig. 1920.—The longitudinal bundles are prolongations of leaf traces, but the transverse bundles at the nodes may be variously interpreted. The "gemmaire" bundles of *Poa annua* may take a longitudinal course like those of the leaf traces.—C. H. Farr.

1061. DRUMMOND, MONTAGU. *Besleria lutea* Linn., a new example of water-calyx. *Ann. Botany* 34: 551-553. 1920.—A description is given of the water-calyx of *Besleria lutea*, a Gesneraceous shrub native in the West Indies and South America. This is the first record of a water-calyx in the family, most of the other examples being found in the related Bignoniaceae. The greatly inflated calyx tube is filled with a clear liquid from the early bud stage until the corolla is fully open. The liquid is probably secreted by capitate glands on the inner epidermis of the calyx.—W. P. Thompson.

1062. GRIEBEL, C. *Die mikroskopische Untersuchung der Tee-und Tabakersatzstoffe*. [Microscopy of tea and tobacco substitutes.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 39: 225-299. 1920.—See Bot. Absts. 7, Entry 1283.

1063. GRIER, N. M. *Notes on comparative regeneration in Elodea and Ceratophyllum*. *Amer. Botanist* 26: 80-84. 1920.—Segments of *Elodea canadensis* must contain a localized bud- and root-forming region, which occurs about every tenth node, in order to regenerate. Each segment of *Ceratophyllum demersum* seems capable of budding. If more than one node is included in the segment, only certain favorably located buds develop.—S. P. Nichols.

1064. HILL, A. W. *Studies in seed germination. Experiments with Cyclamen*. *Ann. Botany* 34: 417-429. Pl. 20, 15 fig. 1920.—The seedling of *Cyclamen* possesses a single cotyledon and a rudimentary curved protuberance lying opposite to it. Morphological evidence is given to show that this rudimentary organ is really a suppressed second cotyledon. This evidence is supported by the results of experiments. It may be induced to develop by the removal of the first cotyledon, and then responds to the removal of its lamina by regenerating a new lamina or new laminae, just as does the first cotyledon when its lamina only is removed. Plumular leaves are unable to respond in this way. The seedling of *Cyclamen*, therefore, through aberrant in type, is truly dicotyledonous in nature.—W. P. Thompson.

1065. KUSTER, ERNST. *Botanische Betrachtungen über entwicklungsmechanische Begriffe*. [Botanical considerations of the principles of the mechanics of development.] *Naturwissenschaften* 8: 453-457. 1920.—A discussion from the standpoint of the botanist of how far the general principles of the mechanics of development, as formulated by Roux, apply to the problems in plant development. This issue is devoted to Roux's work and is in honor of his seventieth birthday.—Orton L. Clark.

1066. MARKLE, M. S. *Some abnormalities in plant structure*. *Proc. Indiana Acad. Sci.* 1918: 117-124. 9 fig. 1920.—The author discusses briefly, and figures: some embedded archegonia and antheridia of ferns; an embryo-sac of *Lilium* with cells all at one end; a "3-story" reproductive branch of *Vaucheria*; and a megaspore tetrad of *Selaginella* with wall around group instead of individual spores.—F. C. Anderson.

1067. MATTIROLO, ORESTE. *Commemorazione di Saverio Belli*. [Memorial to Saverio Belli.] *Atti R. Accad. Sci. Torino* 55: 8-30. 1919-1920. See Bot. Absts. 7, Entry 704.

1068. OGURA, YUDSURI. Some observations on the growth in thickness of trees, especially with regard to that of *Cryptomeria japonica*. Bot. Mag. Tokyo 34: 81-109. 1920.—An English abstract of a fuller account in Japanese in the same volume. The author's observations agree in general with those reported by earlier observers except that he did not find any close agreement between precipitation and the thickness of annual rings.—*L. L. Burlingame*.

1069. [P., D.] James William Helenus Trail. Proc. Roy. Soc. London B, 91: vii-xl. 1920.—Born at Briasy, Orkney, Mar. 4, 1851; died Sept. 18, 1919. Classical and medical education. 1873-75 naturalist South American expedition, displaying exceptional ability. 1877 became Professor of Botany at Aberdeen. Linnean Society, sometime editor *Scottish Naturalist*, later botanical editor *Annals Scottish Natural History* as well as member various European learned societies, being well known for work on galls. President Botanical Section British Association 1910. Death leaves unfinished *Flora of Northeastern Scotland*.—*Paul B. Sears*.

1070. PATTON, R. T. On the growth, treatment and structure of some common hardwoods. Proc. Roy. Soc. Victoria 31 (N. S.): 394-411. Pl. 21, 7 fig. 1919.—See Bot. Absts. 7, Entry 811.

1071. RIVETT, MAUD F. The anatomy of *Rhododendron ponticum* L. and of *Ilex aquifolium* L., in reference to specific conductivity. Ann. Botany 34: 525-550. 1920.—See Bot. Absts. 7, Entry 1297.

1072. S., M. James William Helenus Trail, M.A., M.D., F.R.S., F.L.S. New Phytol. 19: 46-48. 1920.—A brief biography of Professor Trail. [See also Bot. Absts. 7, Entry 1069].—*I. F. Lewis*.

1073. SOUÈGES, RENÉ. Embryogénie des Solanacées. Développement de l'embryon chez les Nicotiana. [Embryogeny of the Solanaceae. Development of the embryo of Nicotiana.] Compt. Rend. Acad. Sci. Paris 170: 1125-1127. 9 fig. 1920.—The proembryo develops as does that of *Chenopodium Bonus-Henricus*, except that the apical cell of the two-celled stage divides before the basal. The division of both these cells is horizontal. In these respects it differs from *Capsella*.—*C. H. Farr*.

1074. ST. JOHN, HAROLD. A teratological specimen of *Aralia hispida*. Rhodora 22: 152-153. 1920.—A description of an abnormal specimen of this species collected on Rattlesnake Mountain, Tyrone, Blair Co., Pennsylvania, in which the umbels of the inflorescence seemed from a distance to be crowned by tufts of green leaves instead of the white flowers or dark angular fruits. Closer examination revealed several types of abnormality in the individual flowers. Apparently the condition was not traumatic.—*James P. Poole*.

1075. UPHOF, J. C. TH. Contributions towards a knowledge of the anatomy of the genus *Selaginella*. The root. Ann. Botany 34: 493-517. 13 fig. 1920.—The greater part of this paper is devoted to a description of the histological details in the root and rhizophore of eighteen species of *Selaginella*. Each species is taken up individually. The more general results are as follows: There is no important anatomical difference in any species between root and rhizophore, while both differ markedly from the stem, notably in lacking lacunae and trabeculae; both are, moreover, negatively heliotropic. It is therefore concluded that the rhizophores are true roots and not leafless stems, as is commonly believed. The vascular system in both is monarch with well developed xylem; endodermis and pericycle are always present; the elements of the phloem are arranged as in the stem.—*W. P. Thompson*.

1076. UPHOF, J. C. TH. Physiological anatomy of xerophytic *Selaginellas*. New Phytol. 19: 101-131. 12 fig. 1920.

1077. WEATHERWAX, PAUL. A misconception as to the structure of the ear of maize. Bull. Torrey Bot. Club 47: 359-362. 6 fig. 1920.—The fact that the rows of an ear of corn always occur in pairs and that, if one member of a pair is dropped part way up the ear, both are, has led to the natural inference that "these irregularities are due to the discontinuance of one or more rows of paired spikelets." COLLINS, in his recent theory as to the origin of the ear, maintains that each pair of spikelets is yoked structurally with another pair on the opposite side and that reduction in number from base to tip is due to the loss of spikelets from yoked pairs. Observation, however, does not bear out COLLINS' contention. Examples are given in which loss of only one pair, and not of yoked pairs, occurs. [See also Bot. Absts. 7, Entry 246.]-P. A. Munz.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1078. ANDREWS, A. LEROY. *Tortula caroliniana*, new species. Bryologist 23: 72-76. Pl. 5. 1920.—A description and figures of a new propaguliferous *Tortula* from North Carolina are given, with extended discussion of its relationships and of the apparent identity with it of certain specimens from central and western Mexico.—E. B. Chamberlain.

1079. ARNELL, H. W., AND C. JENSEN. En bryologisk utflykt till Västmanland. [A bryological trip to Västmanland.] Svensk. Bot. Tidskr. 12: 298-323. 1918.—In the latter part of September, 1915, the authors, in company with G. SAMUELSSON and E. MELIN, visited the northern portion of Västmanland, Sweden, and the results of this trip are recorded in the present paper. The bryophytes collected are first listed separately for each of the localities explored, with definite notes regarding substrata. A systematic catalogue of all the species found is then given. This includes 87 hepatics, 29 *Sphagna*, and 190 mosses, giving a total of 306 species. Two new varieties are described under *Bryum inclinatum*, and *Martinellia mucronata* (H. Buch), originally published as *Scapania mucronata*, is proposed as a new combination. In conclusion attention is again drawn to some of the more noteworthy forms collected, and the various species of *Sphagnum* are tabulated according to their special habitats.—W. W. Gilbert.

1080. BREWSTER, A. A. *Dawsonia polytrichoides*, a hardy moss. Australian Nat. 4: 164-166, 168-169. Pl. 4. 1920.—The author gives a somewhat popular discussion of the structure and reproduction of *Dawsonia polytrichoides* R. Br.—T. C. Frye.

1081. BRYAN, GEO. S. The fusion of the ventral canal cell and egg in *Sphagnum subsecundum*. Amer. Jour. Botany 7: 223-230. Pl. 14, 15. 1920.—See Bot. Absts. 6, Entry 979.

1082. DIXON, H. N. Contributions to antarctic bryology. Bryologist 23: 65-71. Pl. 4. 1920.—The article deals with two collections of mosses, one from Deception Island, South Shetlands, and the other from South Georgia. Deception Island, which has been isolated from a remote period, is a high mountain shell surrounding a sea-filled crater; a small lagoon fed by hot springs maintains a temperature considerably above the surrounding ocean. These conditions seem unique. One small collection yielded 8 species of mosses, one of which, *Bryum crateris*, was new to science. The moss flora of South Georgia contains about 45 per cent endemic species. In the present article 8 species are listed, two, *Andreaea subremotifolia* and *Verrucidens intermedius*, being new to science.—E. B. Chamberlain.

1083. FLEISCHER, M. [Rev. of: SCHIFFNER, V. Über *Lophozia Hatcheri* und *L. Baueriana*. (On *Lophoria Hatcheri* and *L. Baueriana*.) Oesterreich. Bot. Zeitschr. 66: 83-88. 1 fig. 1916.] Hedwigia 60: (Beiblatt) 35-36. 1918.—In comparing *L. Hatcheri* of Patagonia with the closely related *L. Baueriana* of Europe and North America SCHIFFNER reached the conclusion that these two species ought not to be considered synonyms. In commenting on

this conclusion the reviewer emphasizes the danger of regarding two similar plants as distinct species merely because they occur in widely separated regions and are absent from intervening areas. He shows how it is possible for a species to have a discontinuous distribution of this type and advises that each case be decided on its own merits after careful study of all available data.—A. W. Evans.

1084. FLEISCHER, M. [Rev. of: TIMM, R. *Neue wichtige Moosfunde aus dem nordwestlichen Deutschland.* (Important new discoveries of mosses in northwestern Germany.) *Allg. Bot. Zeitschr.* 1916: 17-27. 1916.] *Hedwigia* 60: (Beiblatt) 38. 1918.—The reviewer expresses the opinion that certain species of *Drepanocladus* and *Stereodon*, listed by the author, represent forms or varieties rather than true species.—A. W. Evans.

1085. FLEISCHER, M. [Rev. of: KERN, F. *Beiträge zur Moosflora der Bayrischen Alpen.* (Notes on the moss flora of the Bavarian Alps.) *Jahresber. Schles. Ges. Vaterl. Kultur.* 1917: 1-6. 1917.] *Hedwigia* 60: (Beiblatt) 127-128. 1918.—The reviewer comments on the nomenclature of a few of the mosses listed by the author.—A. W. Evans.

1086. H[IERONYMUS], G. [Rev. of: VAN DEN BROECK, H. *Les muscinées de l'Herbier belge du Jardin botanique de l'État à Bruxelles.* (Bryophytes of the Belgian herbarium of the National Botanical Garden at Brussels.) *Bull. Jard. Bot. Bruxelles* 4: 243-303. 1914.] *Hedwigia* 60: (Beiblatt) 129. 1918.—The reviewer emphasizes the importance of this contribution to the bryophytic flora of Belgium.—A. W. Evans.

1087. FLEISCHER, M. *Die Moosvegetation im Urwald von Bialowies.* [The moss vegetation in the primitive forest of Bialowies.] *Bot. Jahrb.* 55 (Beiheft): 113-124. 1919.—See *Bot. Absts.* 6, Entry 1506.

1088. HAYNES, CAROLINE C. *Illustrations of six species of Riccia, with the original descriptions.* *Bull. Torrey Bot. Club* 47: 279-287. *Pl.* 10-13. 1920.—Descriptions and figures are given of the following North American species of *Riccia*: *R. Donnellii* Aust., *R. dictyospora* M. A. Howe, *R. Beyrichiana* Hampe, *R. arvensis* Aust., *R. hirta* Aust., *R. Curtisii* James.—P. A. Munz.

1089. LORCH, W. *Die Torsionen der Laubmooseta.* [Torsions in the setae of mosses.] *Hedwigia* 61: 40-91. 1919.—See *Bot. Absts.* 6, Entry 1351.

1090. PEARSON, W. H. *Diplophyllum taxifolium* in Westmoreland. *Naturalist* 1918: 234. 1918.—The discovery of *Diplophyllum taxifolium* on Hart Crag, Westmoreland, England, by L. J. Cocks, is reported. The species is new to the county of Westmoreland.—W. H. Pearson.

1091. RICKETT, H. W. *Regeneration in Sphaerocarpos Donnellii.* *Bull. Torrey Bot. Club* 47: 347-357. *Fig.* 1-25. 1920.—Regeneration, or the production of adventitious shoots from vegetative tissue, was observed in *Sphaerocarpos Donnellii* either when the thallus as whole was partly dead, or when portions of it were separated partly or wholly from the rest. In general regeneration originates from a single cell, with a tendency in early stages toward a formation of a two-sided apical cell. A typical thallus develops from the first cell-mass in a way analogous to the development of a mature thallus from the tube formed by a germinating spore.—P. A. Munz.

1092. RUBNER, K. [Rev. of: GREBE, C. *Studien zur Biologie und Geographie der Laubmoose.* I. *Biologie und Ökologie der Laubmoose.* (Studies on the biology and geography of mosses. I. Biology and ecology of mosses.) *Hedwigia* 59: 1-208. 1917.] *Forstwiss. Centralbl.* 41: 431-433. 1919.—See *Bot. Absts.* 6, Entry 610.

1093. THÉRIOT, I. *Contribution à la flore bryologique de Madagascar.* [Contribution to Madagascan mosses.] *Recueil Publ. Soc. Havraise Études Diverses* 87: 95-111. *Pl.* 1, 2. 1920.—The paper gives a list of 66 species of mosses and 8 of hepatics, the latter without

data. The moss list contains precise statements of locality, together with distributional or diagnostic notes upon many of the species, even the commonest. *Campylopus Echernieri* Besch. and *Amblystegium riparium* (L.) B. & S. are reported from Madagascar for the first time, and the fruiting plant of *Leucoloma albocinctum* R. & C. is here first described. *Funaria delicatula*, *Brachymerium argenteum*, *Bryum Perrieri*, *Philonotis Perrieri*, and *Rhacopilum Perrieri* are described as new. There are likewise discussions of *Brachymerium capitulatum* Mitt. and its Madagascan occurrence; of the generic characters of *Nanomitriopsis* R. & C., and of the variability of *Pogonatum subformosum* Besch., a new variety being described and figured. *Leucomium mahorensense* Besch. is reduced to a synonym of *L. debile* (Sull.) Mitt.—*E. B. Chamberlain*.

1094. WILLIAMS, R. S. Calymperaceae of North America. Bull. Torrey Bot. Club 47: 367-396. Pl. 15-17. 1920.—A discussion is given of the Calymperaceae to be treated in the North American Flora and comprising the genera *Syrrophodon* and *Calymperes*. In the former genus are described the following species: *S. rigidus* Hook. & Grev., *S. Bernoullii* C. Müll., *S. floridanus* Sull., *S. incompletus* Schwaegr., *S. Berterianus* (Brid.) C. Müll., *S. martinicensis* Broth., *S. Gaudichaudii* Mont., *S. inflexus* Mitt., *S. Husnoti* Besch., *S. flavescens* C. Müll., *S. tenuifolius* (Sull.) Mitt., *S. lycopodioides* (Sw.) C. Müll., *S. recurvulus* Mitt., *S. graminicola* Williams sp. nov., *S. elongatus* Sull., *S. texanus* Sull., *S. ligulatus* Mont., *S. parasiticus* (Sw.) Besch., *S. filigerus* (Aust.) Williams comb. nov.; in *Calymperes* the following are given: *C. Richardi* C. Müll., *C. cubense* Williams sp. nov., *C. emersum* C. Müll., *C. disciforme* C. Müll., *C. Donnellii* Aust., *C. nicaraguense* Ren. & Card., *C. Heribaudi* Paris & Broth., *C. Nashii* Williams sp. nov., *C. Guildingii* Hook & Grev., *C. lonchophyllum* Schwaegr., *C. Lcryanum* Besch. and *C. fluviatile* Williams sp. nov.—*P. A. Munz*.

1095. WILLIAMS, R. S. *Sematophyllum Smallii*, sp. nov. Bryologist 23: 76-78. Pl. 6. 1920.—Under the above name the author describes and figures a new moss from Florida.—*E. B. Chamberlain*.

1096. WILLIS, M. A. Notes on two hepatics. Ann. Rept. and Trans. Manchester Microsc. Soc. 1916: 44-45. 1918.—The author briefly describes the gametophytes of *Sphaerocarpus michelii* and the capsule of *Anthoceros laevis*.—*C. E. Allen*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

1097. ANONYMOUS. Ancestral studies of Compositae. [Rev. of: SMALL, J. The origin and development of the Compositae. New Phytol. Reprint No. 11. XI + 334 p., 6 pl. Wm. Wesley and Son: London, 1919.] Nature 105: 450. 1920.—See Bot. Absts. 7, Entry 333.

1098. ARBER, E. A. N. AND F. W. LAWFIELD. On the external morphology of the stems of Calamites, with a revision of the British species of Calamophloios and Dictyocalamites of Upper Carboniferous Age. Jour. Linn. Soc. Bot. London 44: 507-530. Pl. 23-25. 1920.—A treatment of the morphology of the rather rare casts or impressions of the external features of Calamite stems with a short systematic revision of the best known British members of the genera Calamophloios and Dictyocalamites, genera recently proposed by Arber for these fossils in order that they may be distinguished from the much more common pith casts. The following external features are discussed in detail: nodes, internodes, leaf scars, branch scars, and root scars. There is much difficulty in correlating specimens showing external features with those represented only by pith casts; this correlation, however, is made in several cases.—*A. J. Eames*.

1099. BERRY, EDWARD W. The geological history of the sweet gum and witch hazel. Plant World 22: 345-354. 2 fig. 1919.—The present distribution of the sweet gum and witch hazel is shown on a map. The disconnected distribution is a sure indication of ancient line-

age and a former occupation of areas where now they are extinct. The oldest authentic fossils of sweet gum are found in the Eocene of Greenland, Alaska, and Oregon. Records in the Oligocene are very rare, the only species having been found in Italy. The Miocene shows nine species, surprisingly like the modern sweet gum. In the Pliocene the gums were cosmopolitan in the northern hemisphere, but the succeeding glacial period killed them out in Europe, whereas they survived in North America and Asia. High mountains and seas in southern Europe prevented the escape of the gums to more genial climes in that continent; but in Asia and North America southern migration and return after the glacial period was possible. The witch hazels shows similar distribution today in America and Asia. Witch hazel occurs as fossils in Europe before the glacial epoch, but is extinct there now.—*Charles A. Shull.*

1100. BERRY, E. W. Paleontology and pragmatism. *Science* 52: 529-531. Dec. 3, 1920.

1101. BROWNE, ISABEL M. P. Phylogenetic considerations on the internodal vascular strands of *Equisetum*. *New Phytol.* 19: 11-25. 7 fig. 1920.—The internodal strands of *Equisetum* are phylogenetic units that may conveniently be termed bundles, though it is not suggested that they are in any strict sense equivalent to the ordinary internodal bundles of angiosperms. The types of bundles found in axes of recent species are considered to have been derived from a single continuous xylem strand, with the metaxylem on its flanks, by the replacement of xylem with parenchymatous elements.—*I. F. Lewis.*

1102. DAHMS, P. Über rumänischen Bernstein. [On Roumanian Amber.] *Centralbl. f. Miner.* 1920: 102-118. Fig. 3. 1920.—The author discusses the sparingly fossiliferous fossil gum or resin "Rumanite" from the Tertiary of Roumania.—*E. W. Berry.*

1103. FISHER, HUGO. Pflanzenmetamorphose und Abstammungslehre. (Plant metamorphosis and evolution.) *Naturwissenschaften* 8: 268-271. 1920.—The change is noted from GOETHE's concept of Morphologie and from its early descriptive literature to that of modern developmental history of plant organs, in which through experimentation the investigator has obtained an insight into the causes underlying changes in plant forms. The deepening of the meaning of plant metamorphosis when interpreted in light of the evolution of plants is then pointed out with numerous examples. We see a development in a certain direction (Orthogenesis of EIMER) but no inheritance of acquired characters is proven. The causes of such evolution are still unknown, but outer causes play only a small part. Metamorphosis is not purposeful except, perhaps, in certain cases, such as adaptations found in changes from a water to land habitat.—*Orton L. Clark.*

1104. FLORIN, RUDOLF. Einige chinesische Tertiärpflanzen. [Chinese tertiary plants.] *Svensk. Bot. Tidskrift* 14: 239-243. Fig. 11. 1920.—The author records the following Tertiary plants from near Han-nor in Mongolia: *Pinus* sp., *Comptonia anderssonii* n. sp., *Carpinus* sp., and *Phyllites*.—*E. W. Berry.*

1105. JOHANSSON, NILS. Neue Mesozoische Pflanzen aus Andö in Norwegen. [New Mesozoic plants from Andö in Norway.] *Svensk. Bot. Tidskrift* 14: 249-257. Fig. 23. 1920.—From the upper Jurassic or Lower Cretaceous of Andö—the only known Mesozoic plant locality in Norway—the author records *Cladophlebis*, *Taeniopteris*, *Feildenia*, and three species of *Sciadopityles*, of which two—*S. lagerheimii* and *S. persulcata*—are considered as new.—*E. W. Berry.*

1106. KRASSER, F. Die Doggerflora von Sardinia. [The Dogger flora of Sardinia.] *Sitzungsber. Akad. Wiss. Wien* 1 (no. 129): 3-26. 1920.—In a continuation of previous studies the author records 37 species of plants from the middle Jurassic of Sardinia. Twenty-three of these are common to the Oolite of the English Yorkshire coast region. A new Williamsonianian fructification is described as *Laconiella sardinica*, an Araucarian seed is described as *Araucarites sardinicus*, and a new type of stem is described as *Sardoa robitscheki*.—*E. W. Berry.*

1107. KRYSHTOFOVICH, A. A fossil walnut from Tsurumi in the district of Konagawa, Japan. Jour. Geol. Soc. Tokyo. 1920. 6 p., 1 pl. 1920.—The author describes a walnut close to the existing *Juglans sieboldiana* from the supposed Tertiary of Tsurumi, Japan.—E. W. Berry.

1108. MÁYAS, G. Funde neuer Pflanzenreste aus dem Kulm von Chemnitz-Borna. [New fossil plants from the Culm (Lower Carboniferous) of Chemnitz-Borna.] XX Bericht Naturw. Gesell. Chemnitz. 55-68. 1 fig., 4 pl. 1920.—The author records the following from the Lower Carboniferous of Chemnitz-Borna: Fourteen Archaeopteridae, of which *Adiantites neuropteroides*, *Sphenopteridium beckerti*, *S. divaricatum*, and *S. latilobatum* are new; thirteen Sphenopteridae, of which *Rhodea minima* and *R. nindeli* are new; two Pecopteridae; two Neuropteridae; and two fern stems.—E. W. Berry.

1109. MENZEL, P. Über Pflanzenreste aus Basalttuffen des Kamerungebietes. [On plant fossils from the Basalt tuff of Kamerum.] Beitr. Geol. Erfors. Deutschen Schutzgebiete 18: 17-32. Fig. 6, pl. 1. Geol. Landesanstalt: Berlin, 1920.—The author lists 234 species in 48 families of tropical African plants preserved in a volcanic tuff in Kamerun, one of the former German colonies in western Africa. The only species described and figured is a species of *Sterculia* close to the existing *S. tragacantha* Lindley. All of the fossils are extremely close to still-existing species of the region, and their age is not determined, but may be anything from late Tertiary to recent. The probabilities all point to the very modern age of the fossil flora.—E. W. Berry.

1110. MOHR, H. Über Funde von Holzkohle im Loszlehm von St. Peter bei Gratz. [On the finding of Lignite in the loamy loess at St. Peter near Gratz.] Ver. Geol. R.-A. 1919: 327-332. 1919.—The author records lignite in the loamy loess of the Pleistocene from near Gratz in Styria.—E. W. Berry.

1111. MOODIE, R. L. Thread moulds and bacteria in the Devonian. Science 51: 14. Jan., 1920.—While making a study of the skeletal parts of ancient vertebrates, the attention of the writer was attracted to enlarged and distorted shapes of lacunae in the carapace of *Borthriolepis* and *Coccosteus*, and to the occurrence of thread moulds and bacteria in the lacunar spaces. The course of growth of these organisms is briefly described. The conditions as outlined by the author are regarded as those of decay of ancient times, and not of disease. He considers that agents of decay similar to those of the present time have been at work for many millions of years, at least since Devonian times.—A. H. Chivers.

1112. MOODIE, R. L. Evolution's most romantic moment. Sci. Monthly. 11: 464-469. 5 fig. 1920.—The Mazon creek in northern Illinois has just cut through 40 feet of glacial deposit and into the shales and rock of the Coal Period. These red shales contain an occasional rounded nodule which cracks open and reveals a Paleozoic insect, fish, leaf, or one of the first animals with legs, such as our present day mud-puppies.—L. Pace.

1113. MOORE, R. L. Ancient bacteria and the beginnings of disease. Sci. Monthly 11: 362-364. 1920.—Germs are among the oldest inhabitants of the earth. WALCOTT discovered bacteria in the oldest fossil-bearing rocks of North America in central Montana. They were rock builders and were found in association with algae. An analogous form is especially active in the Coral reefs in the West Indies today. These ancient ones are called Micrococcus. They were harmless. It is only after the Coal Period that infected wounds are found. The action of early parasites on the shells of ancient animals is the oldest evidence of disease.—Early man may have acquired some of his diseases from animals; for, as seen from the diseased appearance of their bones, men of the stone ages were often afflicted with the same maladies as the cave-inhabiting animals.—L. Pace.

1114. NINDEL, F. Ein Beitrag zur Foyolia sterzeliana (Weiss) aus dem OberKulm von Chemnitz-Borna. [Notes on Foyolia sterzeliana from the upper Culm (Lower Carboniferous) of Chemnitz-Borna.] XX Bericht Naturw. Gesell. Chemnitz. 49-54. Fig. 3. 1920.

1115. PATTON, R. T. **Notes on eucalypt leaves occurring in the tertiary beds at Bulla.** Proc. Roy. Soc. Victoria 31 (N. S.): 362-363. 1919.—Fossil leaves were found in fine mudstone deposited along the banks of the stream beneath the newer basalt. They were among other leaves and lycopodiaceous casts and casts of crushed stems. The material was not sufficient for positive identification. All leaf specimens were of one general type: moderately broad, lanceolate, and slightly falcate; with marginal vein moderately removed from edge, slightly indented; with lateral veins diverging at an angle of 50°, and margin fading into petiole. Leaves are beyond earliest stage of eucalypt evolution and show resemblances to *E. rostrata*.—*Eloise Gerry.*

1116. RAINERI, R. **Alge fossili corallinacee della Libia.** [Some fossil Corallinaceae from Libya.] Atti della Soc. Ital. Sci. Nat. e del Museo Civico Milano. 59: 137. 1920.—The author calls attention to the abundant algal flora preserved in the Upper Cretaceous, Cenomanian, and Turonian stages in the territories of Homs and Cussabat in northern Tripoli. The following forms are recorded from Africa for the first time: *Archeolithothamnium turonicum* Rothpletz, A. aff. *gosaviense* Rothpletz, A. *Paronai* n. sp., *Lithothamnium amphiroaciformis* Rothpletz, *Lithothamnium* or *Corollina* sp. indet., *Amphiroa Mottioliana* n. sp., and *Arthrocardia cretacea* n. sp. This is the first record of the genera *Amphiroa* and *Arthrocardia* in the Cretaceous, neither having been heretofore known in deposits earlier than the Tertiary. —*R. Pampanini.*

1117. RATHER, F. A. **Fossils and life.** Sci. Monthly 11: 429-435. 1920.—Extracts from an address given at the Cardiff meeting of the British A. A. S. Form, habitat, tempo of evolution, the rhythm of life, and the future and man's relation to it are discussed, using only animal fossils as illustrations.—*L. Pace.*

1118. STRAUSS, E. **Ein verkieselter Kletterfarn von Chemnitz-Hilbersdorf.** [A silicified climbing fern from Chemnitz-Hilbersdorf.] XX Bericht Naturw. Gesell. Chemnitz. 46. 1920.—Records a silicified Zygopteris from the Carboniferous of Chemnitz-Hilbersdorf.—*E. W. Berry.*

1119. STRAUSS, E. **Eine Medullosa stellata mit Blattnarben.** [A Medulla stellata with leaf scars.] XX Bericht Naturw. Gesell. Chemnitz. 47-48. 2 fig. 1920.—The author describes a stem of *Medullosa stellata* from the middle Rothliegende (Permian) which shows leaf scars.—*E. W. Berry.*

1120. STUTZER, O. **Über Torfdolomite in Kohlenflözen.** [On calcareous concretions in coal.] Braunkohle. 19: 146-147. 1920.—A summary of the old discussion by STOPES and WATSON on the calcareous concretions "Coal balls" found in the British Coal Measures.—*E. W. Berry.*

1121. T(ANSLEY), A. G. **The evolution of plants.** [Rev. of: CHURCH, A. H. *Thalassiophyta and the subaerial transmigration.* Oxford Bot. Mem. 3. 99 p. Oxford Univ. Press: London, 1919.] New Phytol. 19: 1-10. 1920.

1122. THOMSON, J. A. **The system of animate nature.** 2 vol. 23 cm. H. Holt and Co.: New York, 1920.

1123. WIELAND, G. R. **Recedent lake shores of the Cretaceous.** Science 52: 537-538. 1920.—Tufaceous concretions in the southern Black Hills and near Medicine Bow, Wyoming, are thought to mark the receding shores of Cretaceous lakes, and these concretions are thought to be indicative of algal activity.—*E. W. Berry.*

1124. ZALESSKY, M. D. **Über einen durch eine Zyanaelge gebildeten marinen Sapropel silurischen Alters (Kuckersit).** [A Silurian blue-green algal marine Sapropelite.] Centralbl. f. Miner. 1920: 77-94. Fig. 10. 1920.—The author describes the new genus *Gloeocapsomorpha*, a supposed blue-green alga, Cyanophyceae, which forms the Silurian Sapropelite known as Kuckersite.—*E. W. Berry.*

PATHOLOGY

G. H. COONS, *Editor*C. W. BENNETT, *Assistant Editor*

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1125. ANONYMOUS. [Rev. of: JARVIS, E. Sugar cane diseases at Highleigh. Cairns Post.] Australian Sugar Jour. 12: 363. 1920.—Reports presence of a sugar-cane disease at Highleigh, near Gardonvale, which was due to the presence of the very free occurrence of two fungi—cane rust (*Uromyces Kühnii*) and *Cercospora sacchari*—that normally cause little or no injury. These fungi are always more or less in evidence on older leaves of half-grown cane, but this year owing to wet weather they multiplied in places to injurious degree. If these appear in March or April it is suggested that the lower leaves be stripped and burned at once, but only when the trouble may be considered as being likely to extend to and destroy young foliage. If the disease appears at the end of June or July, the risk of damage is far less, for the sunny weather checks the growth of the fungus. Such factors as proper cultivation, drainage, manuring, and the planting of varieties less susceptible to leaf diseases and the burning of trash after harvesting, are to be recommended.—E. Koch.

1126. ARNAUD, G. Notes de Pathologie vegetale. [Phytopathological notes.] Bull. Soc. Path. Veg. France 7: 54–56. 1920.—Report of observations in the department of Gard, France, April, 1920. The diseases are regarded as due to a period of dry, north winds. The following diseases, which had apparently developed during a moist period preceding the dry period, were observed: Peach pocket (*Exoascus deformans*) on peach and almond; *Coryneum beijerinckii* on walnut, peach, apricot, almond, cherry, and prune; *Monilia cinerea* on cherry; *Taphrina bullata* and *Nectria ditissima* on pear; *Stromatinia cydoniae* on cydonia; *Cycloconium oleaginum* on olive; and chlorosis of grape.—C. L. Shear.

1127. ARTHUR, J. C. Two destructive rusts ready to invade the United States. Science 51: 246. 1920.—Two rusts which seem to have possibilities of great harm, but which have not yet invaded the United States, are mentioned. The first is *Uredo arachidis*, a rust of peanuts, which is widely distributed in South America and is common in the West Indies. The rust has been known to mycologists since 1884, but only recently has it attracted the attention of the cultivator. Mr. ROBSON reports from Montserrat that in some years the disease is a serious menace to the peanut crop of the British West Indies. This rust appears to be working its way northward, since it was reported from Porto Rico in 1913, and from Cuba in 1915. The second rust, *Puccinia pitteriana*, infects potatoes and tomatoes. It was found in Costa Rica in 1904 and 1916, and in Ecuador in 1918. Only one kind of spore, the teliospore, is produced in the life cycle, and this spore germinates at once. The habit of this fungus and its mode of distribution are essentially those of the hollyhock rust. The author points out that both of the above rusts may be capable of great damage if established in a region where suitable host crops are extensively grown.—A. H. Chivers.

1128. BAUDYŠ, E. Prinos gljiva Bosne i Hercegovine. [Fungous flora of Bosnia and Herzegovina.] Glasnik zemaljskog Muzeja u Bosni i Hercegovini 30: 317–328. (1918)–1919.—*Phaneroascus quercinus* n. g., n. sp. (Plectascineae) on living leaves of *Quercus schneideri*. *Phyllosticta allii* n. sp. on living leaves of *A. ampeloprasum*. *Alternaria holcina* (new?) on *Holcus mollis*.—*Mulgedium panciétii* is a new host for *Puccinia mulgedii*. [Through abst. by MATOUSCHEK in Zeitschr. Pflanzenkr. 30: 147. 1920.]—D. Reddick.

1129. BIRMINGHAM, W. A. A condition resembling American "peach rosette." Agric. Gaz. New South Wales 31: 581–582. 1 fig. 1920.—Conditions appeared upon young trees, cions of which had come from America. This disease has evidently been unknown from Australia. Descriptions and suggestions for control are given.—L. R. Waldron.

1130. COCKAYNE, A. H. Fire blight. New Zealand Jour. Agric. 20: 156-157. 1920.—Fire blight due to *Bacillus amylovorus* has appeared in New Zealand. Control methods are suggested, and hope of eradication is expressed.—N. J. Giddings.

1131. CRUCHET. Études mycologiques. Les champignons parasites du "brome dressé," *Bromus erectus* Huds. [Fungous parasites of *B. erectus*.] Bull. Soc. Vandoise Sci. Nat. 51: 583-586. 1918.

1132. DRAYTON, F. L. The essentials of a Dominion plant disease survey. Ann. Rept. Quebec Soc. Protection of Plants 12: 31-33. 1920.—A paper pointing out the advantages to be derived from a well-organized plant-disease survey of the Dominion of Canada and the necessity for coöperation in this survey.—B. T. Dickson.

1133. DUCOMET, V. Un oidium de la pomme de terre. [A powdery mildew of the potato.] Bull. Soc. Path. Veg. France 7: 57-58. 1920.—An oidium is reported on potato (var. Czarine) in Lotet-Garonne in September. Several species have been reported on potato. It is thought this is probably *Erysiphe polygoni*, which was also found on weeds among the potatoes.—C. L. Shear.

1134. EASTHAM, J. W. Report of the Provincial Plant Pathologist. Dept. Agric. British Columbia Ann. Rept. 14: 41-44. 1920.—Yellow rust of raspberries (*Phragmidium imitans*) caused some alarm by its unusual prevalence early in the season, but did not seem to result in much injury to the crop. *Gymnoconia interstitialis* has not been recorded in British Columbia. Walnut bacteriosis (*Pseudomonas juglandis*) was severe on certain trees near Vancouver. Western tomato blight (cause uncertain) brought about loss in the southern Okanagan. Experimental spraying for the control of apple tree anthracnose (*Neofabraea malicorticis*) shows that one early application of 3-4-40 Bordeaux mixture gave good control, and in the case of the variety chosen (Baldwin) gave no extra cost in marketing, the spray material having all disappeared from the fruit during storage preceding packing. As a result of spraying, the fruit also kept better.—J. W. Eastham.

1135. MÜLLER, N. C. Bericht über die Tätigkeit der Agrikulturchemischen Kontrollstation und der Versuchsstation für Pflanzenkrankheiten der Landwirtschaftskammer für die Provinz Sachsen für die Jahre. 1916 und 1917. Halle a. s. 60 p. 1918.—On pages 25 to 29 E. MOLZ reports on diseases occurring in the province. Early blight of potato (*A. solani*) was wide-spread. *Fusarium culmorum* in roots of asparagus was investigated. Stem rot of red clover (*Gloeosporium caulivorum*) occurred to the extent of 50 to 60 per cent. [Through abst. by: O. VON KIRCHNER] in Zeitschr. Pflanzenkr. 30: 22. 1920.]—D. Reddick.

1136. PACHANO, ABELARDO. La enfermedad de California o de Anaheim. [The California vine disease.] Quinta Normal Estac. Expt. Circ. 11. 8 p. 1918.—The California vine disease has been discovered at Ambato, Ecuador. The symptoms are described, and the theories as to the cause are reviewed.—F. M. Blodgett.

1137. PUTTEMANS, A. Sur l'Oidium du Chêne au Brésil. [The powdery mildew of oak in Brazil.] Bull. Soc. Path. Veg. France 7: 37-40. 1920.—*Quercus pedunculata*, which has been introduced into Brazil, has been found to be attacked by several fungi, and in 1912 the powdery mildew was first observed on it in the vicinity of San Paulo. The disease was so severe in September and October that the plants were defoliated. The weather was cold and wet.—The fungus is thought to have been introduced from Europe. In order to determine whether or not the conidia would live for a sufficient period to allow of transmitting the disease from Europe to Brazil, experiments were tried, and it was found that the spores retained the power of germination for a period of from ten to twelve days; this would permit of its transporation from Madeira to Brazil.—C. L. Shear.

1138. RAMÍREZ, ROMAN. Dos parásitos de la remolacha. [Two beet parasites.] Rev. Agric. [Mexico] 5: 141-142. 1 fig. 1919.—An insect pest and a leaf spot due to *Septoria* sp. are reported on the beet (*Beta vulgaris*).—John A. Stevenson.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

1139. BISBY, G. R. Studies of *Fusarium* disease of potatoes and truck crops in Minnesota. Minnesota Agric. Exp. Sta. Bull. 181. 58 p., 11 pl., 30 fig. Mar., 1919.—*Fusarium oxysporum* is the cause of potato wilt. It may attack any part of the potato plant and may cause rot of the seed tuber under field conditions. In the fall it may attack plants which have previously produced a normal crop of tubers. Tubers from affected plants are less satisfactory for planting than those from healthy plants. Any measures which tend to keep the plants vigorous, particularly during the latter part of the season, lessen the danger of wilt.—*Fusarium discolor sulphureum* gains entrance through wounds or through the uninjured surface, and causes dry rot in storage potatoes. Tubers from normal potato vines are subject to this rot. None of the varieties tested were resistant to this dry rot. It may develop on unsprouted tubers even under dry conditions at temperatures below 2°C. At temperatures below 16°C. this fungus produces abundant aerial mycelium, and at 20° to 30°C. a dense pseudopionnotes. This fungus does not affect the starch grains. Wilt in potato plants is not produced, but affected tubers may produce weak sprouts or none.—Careful handling to avoid injury and cleanliness in storage houses are important measures in avoiding injury by rot. The indications are that wilt- or root-rot-producing species of *Fusarium* may show a selective tendency toward host plants. No single species of *Fusarium* is responsible for storage rots in vegetables, cucumbers, and tomatoes. Species of *Fusarium* were found to produce substances that inhibited the germination of spores of the same or other species. After being boiled, solutions of these substances allowed normal germination. *Fusarium* produced substances injurious to excised leaves of potato, coleus, and ragweed. Boiling did not destroy this property. The species of *Fusarium* examined could withstand drying, low temperatures, and alternate thawing and freezing. They were able to utilize a wide variety of food substances.—A. C. Army.

1140. CLINTON, G. P., AND McCORMICK, FLORENCE A. Artificial infection of pines with *Cronartium ribicola*. Amer. Plant Pest Committee Bull. 4: 12. 1920.—Same work as reported in Connecticut Agric. Exp. Sta. Bull. 214: 428-459. Pl. 37-43. 1916-1918.—See Bot. Absts. 6, Entry 225.

1141. DASTUR, J. F. The mode of infection by smut in sugar cane. Ann. Botany 34: 391-397. Fig. 1-10. 1920.—Experiments with sugar-cane smut (*Ustilago sacchari*) showed that infection takes place in susceptible "thin" varieties through the tender buds, but not through old buds unless wounded. The infecting germ tube was found to enter the host tissues through unthickened scale hairs. Infection did not occur through the cut ends of the sets. "Thick" varieties of cane were only infected through wounded tender buds.—W. P. Fraser.

1142. JENSEN, C. N. Blossom infection by smuts. Utah Acad. Sci. 1: 106-113. 1918.—Paper presented to the Academy, April, 1913. A review of the work of BREFELD on infection processes in the Ustilagineae.—D. Reddick.

1143. KUNKEL, L. O. Further data on the orange rusts of *Rubus*. Jour. Agric. Res. 19: 501-512. Pl. D (colored) and 92-94. 1920.—See Bot. Absts. 7, Entry 367.

1144. SCHWEIZER, JEAN. Die Spezialisierung von *Bremia lactucae* Regel. [Specialization of B. 1.] Verhandl. Schweiz. Naturf. Gesell. 99: 224. 1918.—Abst. in Zeitschr. Pflanzenkr. 30: 24. 1920.

1145. TOCHINAI, YOSHIHIKO. Studies on the food relations of *Fusarium lini*. Ann. Phytopath. Soc. Japan 13: 22-33. 1920.—See Bot. Absts. 7, Entry 419.

1146. TREHERNE, R. C. Synopsis Report of the Dominion Entomological Branch in British Columbia. Dept. Agric. British Columbia Ann. Rept. 14: 49-53. 1920. [Also Agric. Jour. British Columbia 5: 25-29.]—Includes observations on insect carriers of fire blight (*Bacillus*

amylovorus). *Empoasca mali* and *Lygus pratensis* were shown to be carriers. "So far as early spring distribution is concerned, ants, honey-bees, click-beetles, apple aphids, and bark beetles are incriminated. Of the click-beetles, *Cardiophorus fenestratus* was observed commonly on the stumps of pear trees which had been cut down for blight and was seen to be feeding on blight exudate."—*J. W. Eastham*.

1147. TUBEUF, C. V. Rückinfektion mit *Peridermium pini* (*Cronartium asclepiadeum*) von der Schlangenzur auf die Kiefer. [Infection with *Peridermium pini* (*Cronartium asclepiadeum*) from snake root to the pine.] *Naturwiss. Zeitschr. Forst- u. Landw.* 18: 99-101. 1920.—Infection was secured on the green shoot and primary needles of 2-year old pine seedlings with teliospores from *Cynanchum vincetoxicum* in August of 1915. At the end of September, 1919, the region beneath the lowest whorl of one of the pines was swollen and covered around with yellow bead-like pycnidial masses. The three upper internodes showed no infection.—*J. Roesser*.

1148. WARTENWEILER, A. Zur Biologie der Gattung *Plasmopara*. [Biology of the genus *P.*] *Verhandl. Schweiz. Naturf. Gesell.* 99: 223-224. 1918.—Abstract in *Zeitschr. Pflanzenkr.* 30: 24. 1920.

1149. WÖBER, A. Die fungizide Wirkung der verschiedenen Metalle gegen *Plasmopara viticola* Berl. et de Toni und ihre Stellung im periodischen System der Elemente. [Fungicidal action of different metals on *Plasmopara viticola*.] *Zeitschr. Pflanzenkrankh.* 30: 51-59. 1920.

THE HOST (RESISTANCE, SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1150. ANONYMOUS. The red coloring matter of plant galls. [Rev. of: M. NIERENSTEIN. *Trans. Chem. Soc.* 1919 (cxv): 1328-1332.] *Nature* 104: 707. 1920.—See *Bot. Absts.* 7, Entry 408.

1151. BAILEY, C. H., AND A. M. GURJAR. Respiration of cereal plants and grains. V. Notes on the respiration of wheat plants affected with stem rust. *Jour. Biol. Chem.* 44: 17-18. 1920.—The rate of respiration of the infected plants was materially lower than that of the sound plants.—*G. B. Riggs*.

1152. BERTRAND, GABRIEL. Action de la chloropicrine sur les plantes supérieures. [The effect of chloropicrine on the higher plants.] *Compt. Rend. Acad. Sci. Paris* 170: 858-860. 1920.—See *Bot. Absts.* 7, Entry 438.

1153. BOODLE, L. A. The scorching of foliage by sea-winds. *Jour. Ministry Agric. Great Britain* 27: 479-486. 1920.—A theoretical discussion of some of the literature bearing on the subject from which the general conclusion reached is "that the scorching of foliage by sea-winds is chiefly due to the drying action of the wind, but that salt may perhaps occasionally contribute towards the production of an injurious effect."—*M. B. McKay*.

1154. BRICK, C. Die Widerstandsfähigkeit gewisser Sorten unserer Kulturpflanzen gegen Parasiten. [The resistance of certain varieties of our cultivated plants to parasites.] *Naturwiss. Wochenschr.* 18: 391-394. 1919.—Susceptibility of plants to diseases is not due to degeneration, old age, and other similar causes enumerated by practical horticulturists, but usually is the result of certain differences in morphological or anatomical structures of the host itself. The increased acid and sugar content or tannin also have a bearing upon the resistance of a variety to parasites. Some plants escape because their season of blossoming or maturing does not coincide with the development of the parasitic organism. These statements are supported by citations of literature dealing with susceptibility and resistance to *Tilletia tritici*, *Ustilago tritici*, *U. nuda*, *Puccinia glumarum*, *P. triticea*, *P. graminis*, *P.*

dispersa, *P. malvacearum*, *Phytophthora infestans*, *Plasmopara viticola*, *Fusicladium dendritum*, *Sphaerotheca mors-uvae*, *Hemileia vastatrix*, *Chrysophlyctis endobiotica*, *Fusarium vasinfectum*, *F. tracheiphilum*, *F. niveum*, and *Heterodera radiculicola*.—Charles Chupp.

1155. EHRENBERG, P. Der Einfluss des Bodens und der Düngung auf Pflanzenkrankheiten. [The effect of soil and manuring upon plant diseases.] Fuhlings Landw. Zeitung 68: 402-412. 1919.—A popular discussion touching on various soil conditions and various manurial additions to the soil that may directly or indirectly cause plant diseases.—A. T. Wiancko.

1156. FOËX, ET. La nécrose du liber de la tige der pomme de terre atteinte de la maladie dite "de l'enroulement." [The necrosis of the wood of the stem of potato occurring in the disease called "leaf roll."] Compt. Rend. Acad. Sci. Paris 170: 1336-1339. 1920.—At the beginning of the necrosis there is first a pectic reaction with ruthenium red safranin, or carmin alum. Later there appears lignin and either cutin or suberin. It therefore appears that the disease is in the nature of a pectic degeneration.—C. H. Farr.

1157. HEINRICHER, E. Zur Kenntnis der Verhältnisse zwischen Mistel und Birnbäumen. [Relation between mistletoe and pear.] Zeitschr. Pflanzenkrankh. 30: 41-51. 1 fig. 1920.—In certain localities mistletoe occurs on pear trees very abundantly; in others it is exceedingly rare. An attempt is made to explain this contrast and especially the local frequency of the "pear mistletoe." It is emphasized that abundant development of the mistletoe on the main trunk of pear trees, particularly of younger trees, is most injurious. Several cases are referred to in which young bearing trees were killed through attacks by the mistletoe. In nature, however, attacks occur less frequently on young trees than on older ones. An infection of the main axis of young trees is not frequent. Mistletoe prefers tree tops. One case is related wherein a pear tree reacted most rapidly against a first infection with mistletoe. A second infection also failed at first, but developed later with considerable vigor. This case, the author states, is of interest, since it does not seem to permit of any other explanation, but that the reactions against seed and viscin of mistletoe are due to antagonistic action of the pear tree. The author suggests the possibility of the development of an "antitoxin" in the pear tree through the toxin of the mistletoe.—H. T. Güssow.

1158. JODIDI, S. L., S. C. MOULTON, AND K. S. MARKLEY. The mosaic disease of spinach as characterized by its nitrogen constituents. Jour. Amer. Chem. Soc. 42: 1061-1070. 1920.—See Bot. Absts. 7, Entry 442.

1159. JODIDI, S. L. A mosaic disease of cabbage as revealed by its nitrogen constituents. Jour. Amer. Chem. Soc. 42: 1883-1893. 1920.—See Bot. Absts. 7, Entry 441.

1160. LEVINE, MICHAEL. The behavior of crown gall on the rubber tree (*Ficus elastica*). Proc. Soc. for Experimental Biology and Medicine 7: 157-158. 1920.—After summarizing briefly the present status of studies upholding the crown gall in its analogy to animal cancer, the author reports that "It was found that *Bacterium tumefaciens* inoculated into the apical internode of the branches, into the leaves or main stem of the rubber tree, *Ficus elastica*, stimulates the development of a neoplasm in the region of inoculation of a benign or malignant nature. The crown galls so formed, in this plant, are of two kinds, one in which growth is uniform and appears to be a swelling, the other is the characteristic convoluted type indicating a peripheral growth of isolated nodules. The crown gall in *Ficus elastica* after a number of months of active growth becomes hard and finally dies. This is associated with the differentiation of the tissue which converts the gall into a mass of parenchymatous cells and nodules of woody fibers. The central portion of the crown gall which generally lies near the wood cylinder disintegrates.—The invasion of the stem by the new growth does not destroy the entire conducting system of the stem, yet that portion of the stem above the gall dies as well as considerable portion of the stem below. Cultures made from pieces of the crown gall and stem above and below the gall yield only a schizomycete which in appearance is not unlike *Bacterium tumefaciens* and which when inoculated into the stems of young

geraniums and rubber plants produce crown galls in the region of inoculation. It is altogether possible that substances of the disintegrating crown gall or products of the crown gall forming organism are carried into the circulation of the stem and are responsible for the progress of the death of the stem from the gall upward and downward. The death of the plant due to crown gall is at least suggestive of the death caused by the invading and disintegrating malignant growths in animal cancer."—*G. H. Coons.*

1161. LOSCH, HERMANN. *Notiz zur Ätiologie der Durchwachsungen bei Birnenfrüchten.* [Etiology of leafy proliferation of pear fruits.] *Zeitschr. Pflanzenkrankh.* 30: 71-73. 2 fig. 1920.—A description of this teratological aberration, disputing SORAUER's explanation of cause as "over-nourishment" of the buds, and referring it as due to freezing of the primary normal buds. Secondary buds then develop during the time of maximum leaf production instead of at a period of low leaf formation, thus giving the leafy proliferation.—*H. T. Güssow.*

1162. MONTEMARTINI, LUIGI. *Nuove osservazioni sopra l'azione eccitante del sulfate di rame sulle piante.* [The stimulating action of copper sulfate on plants.] *Rev. Pathol. Veg.* 10: 36-40. 1920.—See *Bot. Absts.* 7, Entry 1375.

1163. OPITZ. *Fusariumbetall und Auswinterung verschiedener Winterweizensorten.* [Fusarium blight and the over-wintering of various winter wheat varieties.] *Mittheil. Deutsch. Landw. Ges.* 35: 488-489. 1920.—The author describes field plot experiments conducted at two different stations to determine the relation between *Fusarium*-infected winter wheat and winter injury. He planted 20 varieties, using the same varieties at each station. His germination results were uniformly good, running from 92 to 100 per cent. The vigor of the plants in early stages of development ranged from 79 to 99 per cent. Percentage of infection ranged from none at all to 77 per cent. It was expected that the experiments would show a relation between growth-vigor of host and severity of infection, but the results indicated no such relation. There was, however, some indication of varietal susceptibility, but the author purposely omitted the names of the varieties used, pending the time when more definite facts are made known concerning susceptibility of different wheat varieties. According to the experiments of the author there is a relation between severity of infection and over-wintering ability of the host. This relationship, however, seems manifest only when growth conditions are peculiarly favorable to the development of the invading fungus. Seed treatment combined with careful selection of disease-free seed is recommended as a control measure. The author agrees with HILTNER in his recommendation of "uspulum" as a fungicide for prevention of the type of *Fusarium* infection described.—*H. B. Humphrey.*

1164. PETERSEN, FEDERICO. *Los trigos seleccionados de la hacienda Amaluca.* [Selected wheats.] *Rev. Agric. [Mexico]* 5: 112-118. 4 fig. 1919.—Rust due to one or more species of *Puccinia* causes heavy losses to Mexican wheat growers. Three selected varieties, Flor, Maravilla I, and Maravilla II, were found to be somewhat more resistant than the types ordinarily grown.—See *Bot. Absts.* 7, Entry 639.—*John A. Stevenson.*

1165. RAO, P. S. JIVANNA. *The cause of spike in sandal (Santalum album).* *Indian Forester* 46: 469-487. 1920.—The spike disease of sandal is closely related to the parasitism of the plant and may depend upon the sap density of the parent plant. On plants with a high sap density, sandal has greater difficulty in maintaining itself than on species with low sap density; and in plants with a high oil content, the plants do better than where the oil is absent. With depleted water supplies in the host plants, haustoria may be unable to develop sufficiently rapidly to make up the deficit, and the unbalanced circulation comes about. The decreased water supply is accompanied by an increased deposition of starch owing to the absence of a sufficient amount of the transporting fluid. Spike is held not to be due to parasites on the sandal, but is regarded as an abnormal physiological reaction, and the remedy for the condition lies in the use of a strong host with high osmotic values. Lantavas and shrubs should be avoided because of their short lives and inferior quality as hosts, and the care of the host is of greater importance than the care of the parasite.—*E. N. Munns.*

1166. REED, GEORGE M. **Varietal resistance and susceptibility of oats to powdery mildew, crown rust, and smuts.** Missouri Agric. Exp. Sta. Res. Bull. 37. 41 p. 1920.—The resistance of oats, *Avena* spp., to powdery mildew (*Erysiphe graminis* DC. f. *avenae*), crown rust (*Puccinia coronata* Corda), loose smut (*Ustilago avenae* (Pers.) Jens.), and covered smut (*Ustilago levis* (K & S.) Magn.) was tested by inoculation experiments. Of 98 varieties and strains belonging to 14 species, tested with powdery mildew, negative results were obtained only with *Avena bromoides* and *A. sempervirens*. Vigorous infection occurred on all cultivated species. Of 132 strains and varieties belonging to 7 species, tested with crown rust, all were found susceptible, the least infection being 42 per cent, on *Avena brevis*. Of 154 varieties and strains belonging to 7 species tested with loose smut in the field during 5 seasons, *Avena brevis*, *Avena sativa* var. *nigra*, the variety Black Mesdag, and *Avena strigosa* gave consistently negative results; Burt, Early Ripe, Fulghum and other varieties of *Avena sterilis* gave very low percentages of infection, while the *Avena nuda* group proved entirely susceptible. One hundred and forty-six varieties and strains were tested with covered smut during four seasons, and in general they reacted to this test in the same way as they did to loose smut.—L. J. Stadler.

1167. SUEMATSU, NAOJI, AND KIKUJI KUWATSUKA. **Studies on the varietal resistance of the peach to artificial inoculations with Gloeosporium laeticolor Berk.** Ann. Phytopath. Soc. Japan 13: 1-12. 1920.—Experiments in which 66 varieties of peach important in Japan were inoculated proved that none are resistant. Various degrees of susceptibility were found, and two varieties, Tachibanawase and Jitsugetsuto, which ripen early and possess good qualities, proved to be especially resistant. Seven other varieties, which possess somewhat less desirable qualities, are also especially resistant. Chinese species are generally more resistant than the Persian. No evidences of biologic forms of the fungus, nor of the phenomenon of "adaptation" were found.—L. M. Massey.

DESCRIPTIVE PLANT PATHOLOGY

1168. ANONYMOUS. **Forestry, tree diseases and timber.** [Rev. of: RANKIN, W. H. *Manual of tree diseases*. XX + 398 p. Macmillan & Co.: New York and London, 1918.] Nature 105: 579. 1920.—"The first American text book on the subject. . . . The account of *Keithia thuyina*, a dangerous fungus which has recently appeared in England on the valuable forest tree, *Thuya gigantea*, is of considerable interest."—O. A. Stevens.

1169. ANONYMOUS. **Black scab in potatoes.** Jour. Dept. Agric. Ireland 20: 238-241. 3 fig. 1920.

1170. ANONYMOUS. **Potato leaf-curl.** Jour. Ministry Agric. Great Britain 27: 287-289. 2 fig. 1920.—A brief popular description of potato leaf-curl, including a discussion of the cause and control.—M. B. McKay.

1171. BALL, E. D., AND F. A. FENTON. **Potato leaf hopper and the leafburn.** Potato Mag. 212: 6-7. 2 fig. 1920.

1172. BEWLEY, W. F. **"Damping off" of tomato seedlings.** Jour. Ministry Agric. Great Britain 27: 670-673. 1920.—An abridged account of an investigation to be published in full in the Annals of Applied Biology, vol. 7, No. 2, 1920.

1173. BIRMINGHAM, W. A. **Crown gall of fruit trees.** Agric. Gaz. New South Wales 31: 717-718. 3 fig. 1920.—A brief description of the disease is given with suggestions as to preventive measures. Destruction of the diseased tree is recommended. Grafts may be treated with bluestone paste before planting.—L. R. Waldron.

1174. BIRMINGHAM, W. A. **Root rot of fruit trees due to Armillaria mellea.** Agric. Gaz. New South Wales 31: 669-673. 4 fig. 1920.—The appearance of various varieties affected by the disease, methods of dissemination, effect of the disease and control measures are given. "Bluestone paste" may be applied to cut root surfaces after the necessary root pruning has been done.—L. R. Waldron.

1175. BISBY, G. R., AND A. G. TOLAAS. **Potato diseases in Minnesota.** Minnesota Agric. Exp. Sta. Bull. 190. 44 p., 27 fig. 1920.—The most common potato diseases with control measures are discussed. The use of certified seed and seed plot methods are urged in order to keep up vigor. Soil management and cultural directions are given. Suggestions are also given regarding methods of handling and storing.—A. C. Arny.

1176. BRANDES, E. W. **Mosaic disease of corn.** Jour. Agric. Res. 19: 517-521. Pl. 95-96. 1920.—Maize (*Zea mays*) is subject to the same mosaic disease as sugar cane and certain wild grasses. The disease on maize has been noted particularly in sugar cane regions of southern United States and in Porto Rico. The symptoms are essentially like those of sugar cane mosaic. Seed production is suppressed. *Aphis maydis* transmits the "virus."—D. Reddick.

1177. COBB, N. A. **A newly discovered parasitic nematode (*Tylenchus mahogani* n. sp.) connected with a disease of the mahogany tree.** Jour. Parasitology 6: 188-191. 3 fig. 1920.—Technical description of a new species of nematode parasitic in the tissues of the bark of the mahogany (*Swietenia mahogani*) in the Barbados.—E. A. Bessey.

1178. CROMWELL, R. O. **Fusarium blight of the soy bean and the relation of various factors to infection.** Nebraska Agric. Exp. Sta. Res. Bull. 14: 1-43. 5 fig. 1919.—Investigations carried on in North Carolina and Nebraska. This disease was first reported by author in Jour. Agric. Res. 8: 421-440. The following conclusions were reached: The blight is characterized by a chlorosis and shedding of the leaves or leaflets, followed by the death of the plants. Soy bean blight has been observed in several localities within North Carolina on soils infected with cowpea wilt. What is probably the same disease has been recently observed by others in Alabama and possibly in Wisconsin. *Fusarium tracheiphilum* (section *Elegans*) is the causal organism. Cultural and morphological studies which are regarded as of primary importance in distinguishing species of *Fusarium* show that the strain of *Fusarium* on soy bean is identical with the organism producing the wilt of cowpeas. Reciprocal inoculation experiments in field and greenhouse with the strains from soy beans and cowpeas show that cross-inoculations can be made. Physical structure and acidity of soil under natural conditions are not the limiting factors in infection, but acidity under certain conditions may have some influence. Infection occurs through the roots, but nematodes appear not to increase the percentage of blight materially. Other organisms, such as Rhizoctonia and *Sclerotium rolfsii*, and other root injuries are believed to materially increase the percentage of diseased plants in the field. The Black Eyebrow variety of soy beans shows some evidence of resistance. The Brown variety, while not resistant, is tolerant and seems to develop remarkably well in spite of numerous fungous filaments and nematodes within the roots. Fifteen other varieties tested were severely affected. Velvet beans are not subject to infection.—T. A. Kiesselbach.

1179. CUNNINGHAM, G. H. **Mortality among stone fruit trees in Central Otago.** New Zealand Jour. Agric. 20: 359-364. 1920.—See Bot. Absts. 7, Entry 961.

1180. DARNELL-SMITH, G. P. **"Bunchy-top" in bananas.** Agric. Gaz. New South Wales 31: 583-584. 1920.—Description of internal lesions of this disease is given. Growers are advised to avoid planting any plants showing such lesions and to destroy growing plants showing bunchy-top characters. The organism responsible, if any, has not been determined. Bacteria have been isolated from diseased tissues, and a *Fusarium* has been found. It is not known with certainty that the disease is infectious.—L. R. Waldron.

1181. DASTUR, J. F. **Choanephora cucurbitarium (B, and Rav.) Thaxter, on chillies (*Capsicum* spp.).** Ann. Bot. 34: 399-403. Pl. 19. 1920.—A new disease of chillies is described which caused a considerable amount of damage north of the Ganges, India, in 1917. The characters of the fungus causing the disease are given.—W. P. Fraser.

1182. DICKSON, B. T. Some plant diseases in the greenhouse. Ann. Rept. Quebec Soc. Protection of Plants 12: 46-48. 1920.—A brief account of the most important plant pathogenes occurring in the greenhouses at Macdonald College, Quebec, Canada. Those discussed were: *Uromyces carophyllinus* on carnation, *Puccinia antirrhini* on snapdragon, *Microsphaera alni* on sweet pea, *Alternaria violae* on violet, *Cladosporium fulvum* on tomato. Mosaic of tomato and a mosaic-like affection of Cineraria were also considered.—B. T. Dickson.

1183. EASTHAM, J. W. Notes on potato diseases. Agric. Jour. [British Columbia] 5: 210. 1920.

1184. EASTHAM, J. W. Bitter-Pit or Baldwin Spot. Agric. Jour. [British Columbia] 4: 292. 1919.

1185. EASTHAM, J. W. Guard against Apple Powdery Mildew. Agric. Jour. [British Columbia] 4: 44. 1919.

1186. FISCHER, W. Die Brennfleckenkrankheit der Bohnen. [The anthracnose of beans.] Fuhlings Landw. Zeitung. 68: 241-259. 1919.—A popular review of the literature of the anthracnose of beans caused by *Gloeosporium lindemuthianum*, covering its nature, conditions of infection and development, and various methods of treatment. The author also discusses some experiments conducted by himself and others at Bromberg in 1915 and 1916, in which seed from apparently disease-free plants in rows in which diseased seed had been interspersed was selected for planting the following year to see if immune plants could be found. The result was 23 per cent infected plants as against 63 per cent infected plants in rows planted from infected plants of the year before. In 1917 and 1918 tests of selections of disease-free seed from apparently disease-free plants were made on a field which had never grown beans and was located far from the previous trial grounds. There was considerable reduction in disease but still as much as 20 per cent, with an average of 8.2 per cent. This method of getting rid of the disease is not regarded as very promising. The selection of disease-free seed from immune plants in badly diseased fields seems more promising. It is suggested that crossing of different species of beans or beans with related plants may be worth trying; to support this suggestion, attention is called to the observations of several investigators who found that species differed in susceptibility to the disease.—A. T. Wiancko.

1187. HEMMI, TAKEWO. Kurze Mitteilung über drei Fälle von Anthraknose auf Pflanzen. [Short report on three cases of anthracnose of plants.] Ann. Phytopath. Soc. Japan 1³: 13-21. Pl. 1, 5 fig. 1920.—Anthracnoses of *Mahonia japonica* (Thumb.) DC., *Linum usitatissimum* L., and *Illicium anisatum* L., occurring in Japan, are briefly discussed. The cause of the leaf spot of *Mahonia* was found to be a new species of *Colletotrichum*, the author giving it the name *Gloeosporium (Colletotrichum) japonicum*. The pathogene attacking stems and cotyledons of flax is identical with *Colletotrichum linicolum* described by PETHYBRIDGE and LAFERTY. The leaf spot of *Illicium* is caused by a new species, *Gloeosporium Illicii* H. Symptoms of the three diseases and technical descriptions of the two new species are given.—L. M. Massey.

1188. HILEY, W. E. The fungal diseases of the common larch. XI + 204 p., 73 fig. Clarendon Press: Oxford, 1919.—This book opens with a description of the general anatomy of the larch, in which the author defines technical terms which he uses later. The discussion falls under 4 heads: (1) larch canker, *Dasyscypha calycina*; (2) *Fomes annosus*, and other less important heart-rotting fungi; (3) *Armillaria mellea*; (4) leaf and seedling diseases. Approximately 150 pages are given to the discussion of *Dasyscypha calycina*, *Fomes annosus*, and *Armillaria mellea*. Other heart-rotting fungi—e.g., *Polyporus schweinitzii*, *Poria vaporaria*, *Polyporus sulphureus*, and *Trametes pini*—are less important than *Fomes annosus* on larch. The leaf and seedling diseases are not important except under unfavorable conditions, or in nurseries where alternate hosts of the needle rusts are not excluded. The author describes the injury resulting from attack by a given fungus, the relations of host and parasite, the fungus

itself, pure culture experiments, artificial infection, natural infection, and methods of prevention. The researches of HARTIG and BREFELD are reviewed critically in the light of extensive recent field observations and experiments, and the author is of the opinion that *Dasysephypha calycina* enters its host by way of dead branches or branch stubs, *Fomes annosus* through dead roots, and *Armillaria mellea* through damaged or dead roots. The importance of small wounds may have been greatly overestimated. Hard subsoil conditions in cultivated fields are particularly unfavorable to the first rotation of larch planted on such sites, because the tap roots, being unable to penetrate the subsoil, soon die; and *Fomes annosus* almost inevitably attacks these dead roots. First-rotation larch should be planted in mixed stands—e.g., with hardwoods—so that the roots of the latter may break up the subsoil, speed up aeration, and render conditions more favorable for the larch roots. Reasons for the various control methods suggested are thoroughly discussed. The author closes with a general summary of the important points brought out in the book.—*Reginald H. Colley.*

1189. HOUSER, TRUE. **Root rot of tobacco.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 232. 1920.—A short discussion of symptoms of the disease, influence of soil and water, character of soil in plant beds, and methods of control is given.—*R. C. Thomas.*

1190. KAWAKAMA, KOICHIRO, AND SUEHIRO YOSHIDA. **Bacterial gall on *Milletia* plant.** (*Bacillus milletiae* n. sp.). Bot. Mag. Tokyo 34: 110–115. Pl. 2. 1920.—In Japan the authors found that this organism causes rough, irregular, round galls from 5 mm. to 10 cm. in diameter on the stems of *Milletia floribunda*. It is a motile organism about $2.1 + 0.6$ microns, with 7 or 8 peripheral flagella; it produces no spores and is gram negative.—*Leonas L. Burlingame.*

1191. KILLIAN, KARL. **Ueber die Blattfleckenkrankheit der Tomate hervorgerufen durch *Septoria lycopersici*.** [Leaf spot of tomato (*Septoria lycopersici*).] Zeitschr. Pflanzenkrankh. 30: 1–17. 7 fig. 1920.—The following constitutes the author's summary: Spring infection with *Septoria* takes place exclusively through ejection of pycnospores from previous year's infected leaf. Infection may be recognized in the moist chamber after five days by browning and dropping off of the cotyledons. Eight days later spots appear at first on the lower leaf surface; these when dry exhibit fruiting bodies. Similarly the young stems and older stems, but not the fruits (!) are affected. The incubation period is directly related to weather conditions. Artificial cultures indicate that *Septoria* is readily grown on various nutrient materials. Vegetative development is favored by presence of sugar. Fruit bodies develop only after vegetative development is arrested. The fungus penetrates the epidermis, later the intercellular spaces, destroys the tissues of the lower-leaf surface, and finally the upper surface becomes involved. Lastly its offensive action becomes weakened. In cases of severe attack the diseased foliage should be burned in the fall and the surrounding soil dug deeply. Compost which has come into contact with diseased plant remains should be avoided. Rotation is recommended, using plants not subject to attack.—*H. T. Güssow.*

1192. LO PRIORE, G., AND G. SCALA. **L'arrossamento delle foglie del Sommaco.** [The reddening of the leaves of sumac.] Staz. Sper. Agrarie Ital. 52: 227–237. Pl. 7–8. 1919.

1193. LUTMAN, B. F. **Tip burn of the potato and other plants.** Potato Mag. 3²: 6–7, 20, 22–24; 3²: 12, 20–21. 1 fig. 1920.—Reprint of Vermont Agric. Exp. Sta. Bull. 214.

1194. MOLLIARD, M. **Tumeurs présentées par les racines du Chou-Rave et de la Betterave.** [Tumors occurring on the roots of kohlrabi and beet.] Bull. Soc. Path. Veg. France 7: 17–19. 1920.—Large tumor-like outgrowths were found on the roots of kohlrabi and beets in different parts of France. In some cases they arose from the main root and in others from secondary roots. Those on kohlrabi were at first thought to be caused by *Plasmiodiophora brassicae*, but a histological study failed to show any evidence of this. The tumors found on beets were very similar in structure and appearance to those on kohlrabi. Mycelium of a *Fusarium* was found on the surface of the tumor on the beet, but is not believed

to have any causal relation to the tumor. The possibility of this malformation being caused by the crown gall organism or by other parasites or insects is discussed, and it is concluded that the tumors are the result of some form of parasite not yet determined.—*C. L. Shear*.

1195. NOWELL, W. The red wing or root disease of cocoanut palm. *Tropic. Agric.* 54: 240-245. 1920.

1196. NOWELL, W. Root disease of cacao. *Jour. Jamaica Agric. Soc.* 24: 173-174. 1920. —A partial reprint from *Bull. Dept. Agric. Trinidad and Tobago* 18. 1920.

1197. NOWELL, W. Mosaic disease of sugar-cane. *Agric. News [Barbados]* 19: 14. 1920. —A review of Bulletin 829 of the U. S. Department of Agriculture, by E. W. BRANDES, and of Bulletin 19 of the Insular Experiment Station, Rio Piedras, Porto Rico.

1198. PACHANO, ABELARDO. El mildew de la viña. [Downy mildew of the grape.] *Quinta Normal Estac. Exp. Circ.* 9. 8 p. Ambato, 1918.—Introductory note by MARTÍNEZ states that grapes are raised in quantity only in a small part of the Province of Tungurahua, but that conditions are such that grape growing might be greatly extended. Variety tests are being conducted. The variety "White Muscatel of Alexandria" does not ripen at the "Quinta Normal," but should do well in the valley of Patata. A summary of the symptoms, cause, and control of the downy mildew caused by *Plasmopara viticola* is given. It is believed that it was introduced from North America eight or ten years previously.—*F. M. Blodgett*.

1199. PACHANO, ABELARDO. Dos enfermedades de las papas. [Two diseases of potatoes.] *Quinta Normal Estac. Exp. Circ.* 7. 11 p. Ambato, 1918.—Discusses symptoms, cause, and control of late blight caused by *Phytophthora infestans* and early blight caused by *Alternaria solani*. In the comparatively dry climate about Ambato, the early blight is much the more serious, and spraying with bordeaux mixture gave poor results.—*F. M. Blodgett*.

1200. POLE, EVANS, I. B. Anthracnose or zwart roest of the grape (*Gloeosporium ampelophagum*, Sacc.) *South African Fruit Grower* 7: 219. *Pl.* 1-2. 1920.

1201. PUTTEMANS, A. Une nouvelle maladie de la vigne.—L'arrachement des grappillons. [A new grape disease.—Pulling off of the grapes.] *Bull. Soc. Path. Veg. France* 7: 34-36. *Fig.* 1. 1920.—The Isabella grape (*Vitis labrusca*) in Brazil has recently shown a diseased condition in which the grapes are partially torn from the rachis; they then become livid and shrivel up. Other grapes immediately surrounding the first soon become diseased and finally fall off; this suggests a parasitic disease spread by contact. But no parasitic organism has yet been found. In some cases one-third or even one-half of the grapes are destroyed by this disease. The author thinks that the trouble may be due to certain climatic conditions, especially to the sudden variations in temperature, which amount to as much as 30 or 40 degrees C. in 24 hours. Heat and humidity may be able to cause so great disturbance in the activities of the plant as to produce these results. The most compact bunches are affected. The berries grow to abnormal size and crowd each other until some are torn loose by the pressure.—*C. L. Shear*.

1202. RAMIREZ, ROMAN. Enfermedad de los arboles de limon. [A lemon disease.] *Rev. Agric. [Mexico]* 5: 278-279. 1 fig. 1919.—A leaf spot due to *Cladosporium* sp. and *Macrosporium* sp.—*John A. Stevenson*.

1203. SPAULDING, PERLEY. Scientific research in 1919 conducted by the Office of Investigations in Forest Pathology. Report on white pine blister rust control in 1919. *Amer. Plant Pest Committee Bull.* 4: 10-11. 1920.—The author reports experimental work on *Cronartium ribicola* by H. H. YORK at North Conway, New Hampshire, and L. H. PENNINGTON at Lewis, New York viable aeciospores have been caught in traps after having been blown for a distance of 15 or 20 miles and carried upward 5000 feet. Viable urediniospores were caught up to a

distance of 3200 feet from their source. Similar spores caught at a distance of 3400 feet failed to germinate. Viable sporidia were caught in shrubbery up to a distance of 75 feet from their source and 600 feet in an open meadow. Those caught 2400 feet away failed to germinate. Longevity of sporidia is less than 10 minutes with humidity at 90 and temperature of 22-25°C. In other experiments viable sporidia were caught at distance of 180 feet, and those at 300 feet did not germinate. In nine areas where the source of sporidia was localized it was proved that serious infection of pines occurred up to less than 200 feet from the currants. Surgical treatments of diseased pines have shown that where the cut was made at least one and one-half inches back from the visibly affected part, the eradication was successful.—*W. H. Rankin.*

1204. STAKMAN, LOUISE J. A *Helminthosporium* disease of wheat and rye. Minnesota Agric. Exp. Sta. Bull. 191: 24 p., 5 pl. 1920.—A disease of wheat due to a *Helminthosporium* causes foot rot in seedlings, and death of the seedlings often results. Secondary infections often occur on any part of the plant, including the seeds, above ground. The common wheat, durum, club, emmer, einkorn, and rye, and many other grasses were found susceptible. The organism is carried on the seed and is not destroyed by formaldehyde treatments. Control measures consist in using seed from uninfected fields, and in following good cropping methods.—*A. C. Arny.*

1205. TAUBENHAUS, J. J. Diseases of greenhouse crops. $x + 429$ p. 82 pl. Dutton and Co.: New York City, 1920.—In this book "intended as a guide to practical growers, teachers, students and investigators in plant pathology," the author aims to "bring together available information on the subject and to place it at the disposal of the greenhouse men." Following a statement that the total value of forced plants and flowers, as estimated for 1909, was \$24,930,000, it is pointed out that a conservative estimate, however, may place these losses (from plant disease) at about 30 per cent.—The book is divided into six parts, under the following heads: (1) The soil, healthy and "sick;" (2) Cultural considerations, in which breaking the rest period of plants is included; (3) Diseases of greenhouse vegetables (includes also mushrooms); (4) Diseases of ornamentals; (5) Greenhouse pests, under the topics plant pests (red spiders and mites) and thrips (includes also mealy bugs, scale insects, white fly, aphids, soil insects, ants, millipeds, sow bugs, slugs, etc.); (6) Methods of control, in which are outlined methods of preparing insecticides and fungicides, methods of fumigation (with burning sulphur and cyanides) and hygienic considerations. Sections (4) and (5) make up the bulk of the book, and here the diseases are briefly discussed, and literature citations made. The book terminates with a simple glossary of technical words.—*G. H. Coons.*

1206. TRAVERSO, G. B. La "lebbra" ed il "vaiolo" del Sommaco. [The "lebbra" and the "vaiolo" of the Sumac.] Staz. Sper. Agrarie Ital. 52: 213-226. Pl. 5 (col.) and 6. 1919.

1207. VAN DER BIJL, P. A. A leaf spot of the peanut or monkeynut plant caused by the fungus *Septogloeum arachidis* Rac. Jour. Dept. Agric. Union of South Africa 1: 528-530. Fig. 1-2. 1920.—This disease has been noticed especially along the Natal coast, and occasionally becomes sufficiently serious to warrant the application of a protective spray.—*E. M. Doidge.*

1208. WATERS, R. Take-all disease in wheat. New Zealand Jour. Agric. 20: 137-143. 3 fig. 1920.—The disease is extremely destructive in Australia, and has evidently been present in New Zealand for some years. The fungus (*Ophiobolus graminis*) is found upon typically affected plants. Fruiting bodies of the fungus have been identified. Inoculation experiments have not been conducted. Diseased plants usually occur in circular or oval patches. The plants are stunted, more or less bleached, and finally show black masses of the fungus on the underground parts. A similar dwarfing of the plants may be due to crowding by weeds, but in such cases there is no bleaching. Water-logged soil, and the grass grub (*Odontria zealandica*) also cause dwarfing, but the presence of the black mycelium of *Ophio-*

lobolus late in the season will distinguish this disease. Other susceptible hosts are *Hordeum sativum*, *Secale cereale*, *Hordeum murinum*, *Bromus sterilis*, and *Agropyron repens*. Control measures suggested are burning of stubble, rotation, deep tillage and heavy applications of lime. Good drainage is an important factor in control, and the land must be kept free from susceptible plants.—N. J. Giddings.

1209. WATERS, R. **Take-all disease in wheat**. New Zealand Jour. Agric. 20: 287-288. 1920.—Cultures of *Ophiobolus graminis* were secured from ascospores. On standard agar the mycelium was white. There was no evidence of fruiting in culture. Wheat plants from disinfect seed grown in sterilized soil were inoculated by placing near the plant a bit of medium containing the fungus. Four inoculated plants died in from 28 to 36 days, while controls were in good condition at the end of 58 days. Re-isolations were secured from the rootlets of some of the dead plants. Several other methods of inoculation gave no infection.—N. J. Giddings.

1210. WELTEN, HEINZ. **Pflanzenkrankheiten**. [Plant diseases.] 199 p., 5 pl., 76 fig. Phil Reclam, Jr.: Leipzig, 1919.

1211. WHIPPLE, O. B. **Degeneration in potatoes**. Montana Agric. Exp. Sta. Bull. 130. 29 p., 16 fig. Apr., 1919.—The results are given from five-years' work upon potato projects. Degeneration includes various potato ailments which are not, so far as known, traceable to the attacks of parasitic organisms, and includes spindle sprout, curly dwarf, and probably mosaic and leaf roll. Characteristic symptoms are the loss of vigor of the plant, and a corresponding loss in yielding power. For control it is necessary to turn to seed selection and better cultural methods. In the experiments the plots were planted on the tuber-unit and tuber-line plan. Regarding spindle sprout and yellow top, probably a stage of spindle sprout, the deterioration is apparently sudden and complete, and may be brought about by improper storage of the tubers or unfavorable growing conditions.—Curly-dwarf is the most serious condition. It is a gradual deterioration; the transition from normal to curly dwarf covers a period of two, three, or more seasons. Supposed mosaic degenerates have in their behavior resembled typical curly-dwarfs and are in this paper so considered. The first indications of curly dwarf are a slight crinkling and reduction in the size of the leaf. A plant showing the above foliage symptoms would be classed as an intermediate. Experiments prove that intermediates of one season are, as a rule, the curly dwarfs of the next. Tubers from curly-dwarf vines if planted produce no marketable tubers. Tubers from degenerate types are, as a rule, shallow-eyed, when compound with those from normal vigorous plants, and efforts to improve the type of tubers by the selection of shallow-eyed seed tubers should be undertaken, according to the author, with extreme caution.—H. E. Morris.

1212. WHITE, E. W. **Apple-tree Anthracnose or Black Spot Canker**. Agric. Jour. [British Columbia] 4: 206-207. 1919.

1213. WOLF, F. A. **Report of the Division of Plant Pathology and Bacteriology**. North Carolina Agric. Exp. Sta. Ann. Rept. 42: 65. 1920.—Subject matter of this report is covered in bulletin on clover stem rot in: North Carolina Agric. Exp. Sta. Bull. 16: 15-18. 3 pl. 1919. [See Bot. Absts. 3, Entry 1669.]—F. A. Wolf.

ERADICATION AND CONTROL

1214. ANONYMOUS. **La "anthracnosis" de la vid.** [Anthracnose of the grape.] Informacion Agric. [Madrid] 10: 153. 1920.—Treatment for grape anthracnose (*Gloeosporium ampelophagum*).—John A. Stevenson.

1215. ANONYMOUS. **Tumores bacterianos**. [Bacterial tumors.] Informacion Agric. [Madrid] 10: 170-171. 2 fig. 1920.—The nature and control of the olive knot disease due to *Bacterium savastanoi*.—John A. Stevenson.

1216. ANONYMOUS. **Control of silver blight.** New Zealand Jour. Agric. 20: 374-377. 1920.—The experiments deal principally with stone fruits. The treatments include tests with a number of fertilizers, with lime, and with copper sulphate and Bordeaux mixture. The only materials which appeared to be of any possible value were the copper sulphate and the Bordeaux mixture.—*N. J. Giddings.*

1217. ANONYMOUS. **Spraying calendar for apples in North Carolina.** North Carolina Agric. Ext. Service Circ. 101. 4 p. 1920.—Directions for spraying apples to prevent attacks by insects and plant diseases.—*F. A. Wolf.*

1218. BECK, OLGA. **Über eine Methode der Saatgutuntersuchung auf Brand und über das Versagen der Kuperfvitriolbeize.** [A method of testing wheat for smut contamination and possible omission of the blue vitriol disinfection.] Naturwiss. Zeitschr. Forst-u. Landw. 18: 83-99. 1920.—The author describes an original method for determining arithmetically the number of smut spores in any sample, and from this predicting the percentage of infection likely to result in the subsequent crop. Under certain conditions seed treatment may be safely omitted.—*J. Roeser.*

1219. BISBY, G. R., AND A. G. TOLAAS. **The use of Bordeaux mixture for spraying potatoes.** Minnesota Agric. Exp. Sta. Bull. 192. 31 p., 4 fig. 1920.—Bordeaux mixture is a preventive of late blight in potatoes. It also reduces the injury from other leaf diseases and repels certain insects. A 5-5-50 mixture has been found better than weaker ones. The indications are that spraying may result in the production of more vigorous tubers.—*A. C. Arny.*

1220. BLAIR, R. E. **The work of the Yuma reclamation project experiment farm in 1918.** U. S. Dept. Agric. Dept. Circ. 75. 77 p., 32 fig. 1920.—Preservative treatments for willow posts.

1221. BRAUN, HARRY. **Presoak method of seed treatment; a means of preventing seed injury due to chemical disinfectants and of increasing germicidal efficiency.** Jour. Agric. Res. 19: 363-392. Pl. 69-82. 9 fig. 1920.—Full experimental data in support of conclusions previously published.—See Bot. Absts. 3, Entry 2576.—*D. Reddick.*

1222. BRYCE, P. I. **Can we improve potato storage?** Ann. Rept. Quebec Soc. Protection of Plants 12: 53-59. 1920.—The article deals with statistics showing the importance of the crop in Canada, the chief storage rots, and suggestions on storing potatoes both in small and large lots.—*B. T. Dickson.*

1223. COONS, G. H. **Safeguarding next year's wheat.** Michigan Agric. Exp. Sta. Quart. Bull. 31: 9-11. 1920.

1224. DETWILER, SAMUEL B. **White pine blister rust control in 1919.** Amer. Plant Pest Committee Bull. 4. 10 p. 1920.—A summary of the proceedings of the fifth annual International Blister Rust Conference held at Albany, New York, on December 8-9, 1919. As the result of four-years' field work it is now proved that white pine blister rust (*Cronartium ribicola*) can be controlled locally if the currant and gooseberry bushes are destroyed within 200-300 feet of the pines. It has been proved that unskilled laborers with trained supervision remove on the average 95 per cent of the bushes in the first working of an area. It has been found that *Ribes* does not multiply rapidly in an eradication area, and a second eradication does not seem necessary for five or ten years after the first. No new pine infections were found in 1919 on four control areas carefully examined. The labor costs per acre for eradication in the New England States average between 24 and 42 cents. The number of pines that are affected in the New England States is said to be increasing rapidly. On an area of 72 square miles in New Hampshire it was estimated that one-fourth of the pines are affected. The Conference believes that it is necessary in the infected regions for white pine owners to

destroy currants and gooseberries within 200 feet of the pines if they are to save the pines. The rust has not been found in Western United States, and the existing quarantines are considered a safeguard. The resolutions adopted urgently recommend that the destruction of the currants and gooseberries in white pine stands be adopted generally in infected regions; that pine and currant growing regions be segregated by law; that the cultivated black currant be outlawed; that state and federal experimental work be continued; that scouting in the western states be continued; and that an accurate census of the white pine in the country be made by the federal government. The experimental and practical control work done on control areas in the various states is summarized by states. No blister rust was found on pines in 1919 outside the New England States, New York, Minnesota, and Wisconsin.—*W. H. Rankin.*

1225. DUCOMET, V. *De la lutte contre le Phytophthora infestans.* [Combating *Phytophthora infestans.*] Bull. Soc. Path. Veg. France 7: 59–65. 1920.—The principal work carried on in different countries in the prevention of late blight of potato is reviewed. In the author's region—Grignon—four applications of Bordeaux mixture are sufficient in the worst seasons, and usually two suffice.—*C. L. Shear.*

1226. DUTTON, W. C. *Dusting and spraying experiments of 1918 and 1919.* Michigan Agric. Exp. Sta. Special Bull. 102. 50 p., 20 fig. 1920.—Comparative dusting and spraying experiments with fungicides and insecticides were carried on in 1918 and 1919 in several orchards in various parts of Michigan, the fruits being apple, cherry, plum, peach and currants. A few experiments were also made with potatoes. For apples, the scab was as well, and in some cases better, controlled by the sulphur dust than by the lime-sulphur spray. Dry lime-sulphur dissolved in water and sprayed gave poor control, as did barium tetrasulphide (B. T. S.). The latter caused russetting of the fruit in some varieties. The lime-sulphur sprays injured the leaves a little, while the sulphur dust did no harm. Of the insecticides, lead arsenate gave uniformly good results. Calcium arsenate burned the foliage somewhat and gave only fair control of codling moth. Magnesium arsenate, on the contrary, was unsatisfactory as a control and caused serious burning. On cherries, dusting with sulphur (90 parts) and lead arsenate (10 parts) did not control, although it delayed for about two weeks the onset of leaf blight (*Coccomyces hiemalis*). The trees were badly defoliated by the middle of September. The trees sprayed with lime-sulphur (plus arsenate of lead) remained free from the disease until late in September, more than two months after the last spraying, when a small amount of infection occurred. In the same orchard the dusted and check trees showed serious loss from *Coniothyrium*, which caused cankers at the point of attachment of the fruit pedicel, causing the drying up of the fruit. The sprayed trees did not show this trouble. Other spraying and dusting experiments with cherry and plum were inconclusive because of lack of insect and fungous trouble in the unsprayed plots. For leaf curl (*Exoascus deformans*) of the peach the 90–10 dust mixture (sulphur and lead arsenate) applied March 7 was practically of no value. The Niagara soluble sulphur was only very slightly better. The dry-lime-sulphur dissolved and applied as a spray showed much better results than the dust treatments, but still did not give good control. Magnesium arsenate as an insecticide caused almost complete defoliation of the peach. Currants sprayed with bordeaux mixture remained healthy throughout the season; those dusted and those sprayed with lime-sulphur showed yellowing of the leaves and lost much foliage. Bordeaux mixture controlled the anthracnose (*Pseudopeziza ribis*) successfully. The other treatments reduced the anthracnose but did not control it. Of the varieties tested, the untreated bushes showed great variation in susceptibility to anthracnose. Prince Albert is very resistant; London Market resistant, Wilder, Perfection, Fay's Prolific, La Versailles, Cherry and Red Cross are susceptible; and Red Dutch is very susceptible. With potatoes, calcium arsenate applied as a dry dust (85 parts with 15 parts of talc as a filler) or sprayed on at the rate of 1½ lbs. in 50 gallons give equally perfect control of the Colorado potato beetle.—*E. A. Bessey.*

1227. EVANS, N. H. *Report on experiments for the control of Apple Scab.* Ann. Rept. Dept. Agric. (British Columbia) 14: 25–27. 1920.

1228. EWERT. **Brauchbare Ersatzmittel für altbewährte Mittel zur Abwehr von Pflanzenkrankheiten im Obst- und Gartenbau.** [Useful substitutes for well-known mixtures in the control of plant diseases in orchard and garden.] Illust. Schlesische Monatsschr. Obst-, Gemüse- und Gartenbau 1918: 96-97. 1918.

1229. GOSSARD, H. A. **Dust spraying.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 147-149. 1920.—This is a report of tests during 1916-1917 comparing dusting with liquid applications and giving the respective costs.—*R. C. Thomas.*

1230. HARDENBURG, E. V. **Potato inspection in New York in 1919.** Potato Mag. 2¹²: 9, 38. 1920.

1231. HILTNER, L. **Ueber die Beizung des Wintergetreidesaatguts.** [On the treatment of winter-wheat seed.] Mitteil. Deutsch. Landw. Ges. 35: 486-487. 1920.—The Agricultural Institute in Munich has worked for the development of an organization involving the employment of inspectors charged with the duty of instructing farmers in the details of seed treatment and enforcing the requirements that all seed be treated. The author recommends "fusariol" as a practical fungicide for prevention of bunt (*Tilletia* sp.), and adds that its use results in improved stand and yield. He compares "fusariol" with formaldehyde, "uspulum," "fusafine," and a new fungicide, "sublimoform." The author warns against the use of copper sulphate because of injurious effect on germination. For control of barley stripe disease (*Helminthosporium graminum*) he recommends a 0.25 per cent solution of "uspulum" as the most satisfactory of fungicides employed in his experiments. In the prevention of *Fusarium* infection in rye the author obtained best results as to stand and yield when he used fusariol. Very satisfactory results were obtained also from the use of "uspulum."—*H. B. Humphrey.*

1232. HOWARD, W. L. **Brown rot of apricots and its prevention.** Better Fruit 15¹: 7. 1920.

1233. HUNT, E. C. **Report of Assistant Horticulturist and Inspector of Fruit Pests, East and West Kootenay districts.** Ann. Rept. Dept. Agric. (British Columbia) 14: 36-39. 1920.—Spraying for control of apple scab with (1) Bordeaux mixture containing excess of lime, "soluble sulphur" being used for the calyx spray, (2) lime-sulphur solution, and (3) sulphur dust. The first gave best control, and in the case of McIntosh Red, a slightly greater yield than lime-sulphur. Sulphur dust gave very poor control, 86.95 per cent of the fruit of McIntosh Red being scabby.—*J. W. Eastham.*

1234. JOHNSON, A. G., AND J. G. DICKSON. **Stem rusts of grains and the barberry in Wisconsin.** Wisconsin Agric. Exp. Sta. Bull. 304. 16 p., 6 fig. 1919.—A general statement of the relation of the common barberry to the spread of the stem rust (*Puccinia graminis*) of cereals and grasses. The difference between the stem rust and leaf rust is explained by photographs, and a chart shows the extent of spread of the stem rust from an infected barberry hedge.—*E. M. Gilbert.*

1235. LAFFER, H. E. **Bordeaux powders vs. home-made bordeaux mixtures.** Agric. Gaz. New South Wales 31: 595. 1920.—Trials with proprietary Bordeaux powders showed them to be ineffective in controlling grape downy mildew.—*L. R. Waldron.*

1236. LEIBY, R. W. **Spraying Irish potatoes.** North Carolina Agric. Ext. Serv. Circ. 103. 14 p. 1920.—A popular treatment of subject matter in Bull. North Carolina Dept. Agric. 40³: 7-38. 10 fig. 1919.—*F. A. Wolf.*

1237. LETTEER, C. R. **The work of the San Antonio experiment farm in 1918.** U. S. Dept. Agric. Dept. Circ. 73. 38 p., 4 fig. 1920.—Effect of rotation and tillage on cotton root rot.—See Bot. Absts. 6, Entry 1423.

1238. MACRUM, C. A. Combined bordeaux oil emulsion spray. Better Fruit 14⁸: 9, 39. 1920.—Directions are given for making a combination spray solution by the addition to each 200 gallons of 1.5 per cent Bordeaux mixture (6–60) of 1½ pounds glue and 12 gallons oil emulsion.—A. E. Murneek.

1239. MAHEUX, GEORGES. Spraying to increase potato production. Ann. Rept. Quebec Soc. Protection of Plants 12: 43–46. 1920.—Results of potato spraying on sixty experimental plots in forty countries are given. The yield for 1919 was 50 per cent higher in plots sprayed four times than the check plot, and the net profit \$30.00 per acre more.—B. T. Dickson.

1240. MARTIN, W. H. The relation of sulfur to soil acidity and to the control of potato scab. Soil Sci. 9: 393–409. 1920.—In the experiments reported, five types of soil and two varieties of potatoes were used. It was found that when sulphur was added to the soils the decrease in scab corresponded to the increase of soil acidity as measured by the hydrogen-ion concentration. The increase in acidity depended not only upon the amount of sulphur added, but upon the percentage of sulphur which was oxidized. Where the hydrogen-ion concentration of water extracts of the soil was P_H 5.8 or less before sulphur was applied, 300 to 500 pounds per acre gave approximately as good control as heavier applications. Where the initial hydrogen-ion concentration exceeded 6.0 heavier applications (600–1200 pounds) gave best control.—Dorothy Wilson.

1241. McCUBBIN, W. A. The seed potato question. Seed World 8⁵: 24–25. 1920.

1242. NEWELL, W. Citrus canker eradication in Florida. Monthly Bull. California State Commission Hort. 8: 394–395. 1919.—The rapid spread of the citrus canker disease, in Florida after 1912, when it was first observed by Dr. E. W. BERGER is noted. Through the aid of the state appropriations, however, work was conducted from 1912 to 1919 which practically eradicated all signs of the disease.—E. L. Overholser.

1243. NOWELL, W. Red ring disease of coco-nuts. Agric. News [Barbados] 19: 222. 1920.—A method for the disposal of nematode-infested material is given. It consists in digging up the palm by the roots and sawing the trunk into 3-foot lengths over the pit formed by the digging. Each length is then split longitudinally into about 6 pieces, and the whole lot of material, including leaves, sawdust, etc., is placed in the pit over some brushwood in the manner in which it is usual to place material for burning charcoal. The heap is then set on fire and left to burn slowly under a covering of earth until all has been burnt to ashes. The method is somewhat expensive, but the results obtained justify its employment.—J. S. Dash.

1244. PETHYBRIDGE, F. R. Potato spraying trials in the Cambridge Fens, 1919. Jour. Ministry Agric. Great Britain 27: 282–286. 1920.—Results are given from some potato-spraying trials conducted during 1919 in which 1 and 2 per cent Bordeaux and Burgundy mixtures were used at the rates of 85 and 200 gallons per acre. In all cases some scorching of the foliage was obtained, and in a few cases it was severe. The weather was hot and dry during a part of the season, and this was said to be the cause of the scorching. The yields were less in the sprayed than in the unsprayed plots.—M. B. McKay.

1245. PIPAL, F. J. The barberry and its relation to the stem rust of wheat in Indiana. Proc. Indiana Acad. Sci. 1918: 63–70. 2 fig. 1920.—The author discusses briefly the history of *Berberis vulgaris* in its relation to wheat rust and cites 13 specific cases of rust outbreak investigated during the summer of 1917.—F. C. Anderson.

1246. REGAN, W. S. The destruction of *Ribes* by chemical means. American Plant Pest Committee Bull. 4: 12. 1920.—Dip oil, containing 25 per cent cresol, sprayed on tops or crown of bushy species kills in the majority of cases. Dilutions of dip oil with fuel oil, 36.3 degrees Beaumé, at the rate of 1 to 5 and 1 to 8 is advised for areas of skunk currant (*Ribes*

cynosbati), two or three applications being necessary to kill. Spraying the foliage kills in from a half hour to a few hours. Efficiency of dip oil is little effected by rain, sunlight, absence of foliage, or season. Fuel oil alone is effective if two or three applications are made. Neither oil is poisonous to animals. Treatment is economical where pulling is difficult. Compressed-air hand sprayers were used.—*W. H. Rankin.*

1247. ROBERTSON, W. H. **Commercial and home-made lime-sulphur spray.** Agric. Jour. [British Columbia] 4: 375. 1919.

1248. RODDA, T. E. **Control of brown rot on peaches.** New Zealand Jour. Agric. 20: 20-23. 1920.—Brown rot did not develop to any extent on account of the dry season. Fruit was treated to prevent development of brown rot after picking. Dipping in bluestone 1-10 or 1-20 caused fruit injury, while 1-40 was apparently safe. Formalin solution 1-50 produced spots on the fruit, while 1-100 did not injure it. Lime-sulphur solution 1-15 and 1-30 did not affect fruit, but the 1-15 left too heavy a deposit on the peaches. Permanganate of potash 1-640 did not injure fruit. Applications of Bordeaux powder, sulphur dust, and a lime-sulphur dust were unsatisfactory. Fumigation with sulphur ($\frac{1}{4}$ oz. per 100 cu. ft.) and with formalin ($\frac{1}{2}$ oz. per 100 cu. ft.) injured the fruit.—*N. J. Giddings.*

1249. SCHAFFNIT, E. **Versuche zur Bekämpfung des Kartoffelkrebses im Jahr 1918/19.** [Control experiments against Potato Canker (Black wart.) Zeitschr. Pflanzenkrankh. 30: 59-67. 1920.—Author states that soil disinfection experiments gave no practical results. He then discusses the results of experiments relative to resistance of potato varieties to *Chrysophlyctis endobiotica*. Of the varieties tested for five years the following proved immune: (1) Early: Sechswochen (verbesserte lange), Poppehurl; (2) Medium Early: Koralle, Lech; (3) Medium Late: Danusia, Jubel, Ada; (4) Late: Agraria, Erika. A number of the varieties tested for a period of four years also remained without attack.—It is important to note that some varieties proved immune for one year or several years, but were slightly attacked in other years. This observation is explained as due to the use of "deteriorated" seed. Author suggests that the immunity of the varieties mentioned is not absolute, but only relative; that varieties showing immunity under normal conditions may lose this faculty as soon as the plant no longer exhibits its normal form of development and is weakened in its physiological functions, as a result of pathological conditions transmissible through the seed tuber. The contrasting results given by author in support of his argument seem to substantiate his findings. Hence there exists in these varieties and in their behaviour towards the causal agent of potato canker a classical example of immunity and "predisposition" (in SORAUER's sense) of plants according to their constitution in their relation to a pronounced parasite. The use of varieties of proven immunity on infected lands is recommended under proper legislative safeguards.—*H. T. Güssow.*

1250. SCHOENE, W. J. **Twelfth report of the State Entomologist and Plant Pathologist 1918-1919.** Quart. Bull. Virginia Crop Pest Commission 14: 1-28. 1920.—Contains brief notes on the following topics: Inspection for pine blister rust; cedar rust and cedar eradication; "Take-all" disease of wheat in Virginia.—*F. D. Fromme.*

1251. SELBY, A. D., AND R. C. THOMAS. **Bordeaux mixture an active fungicide.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 220. July, 1920.

1252. SHAPOVALOV, MICHAEL. **The potato-scab control problem as it stands to-day.** Potato Mag. 21: 8-9, 26. 3 fig. 1920.

1253. TICE, C. **Certified potato seed production.** Agric. Jour. [British Columbia] 5: 197. 1920.—See Bot. Absts. 7, Entry 665.

1254. VAYSSIERE, P. [Rev. of: VERMOREL (V) AND DANTONY (E.) **Composition chimique des Bouillies sulfo-calciques employees contre les Insectes et les Maladies des plantes.** 20 p. Montpellier et Villefranche, 1919. (Chemical composition of lime sulphur used in combating insects and diseases of plants.)] Bull. Soc. Path. Veg. France 7: 86. 1920.—*C. L. Shear.*

1255. WESTERDIJK, JOHANNA. **Das Spritzen der Kartoffeln in den Niederlanden.** [Spraying potatoes in Holland.] *Jahresb. Verein. Angew. Bot.* 16: 132-138. 1918.—Spraying for potato blight (*Phytophthora*) is much commoner in Holland than in Germany. It is particularly necessary in the provinces near the sea. Two treatments beginning late in June are important. A third treatment often is necessary. In Friesland six treatments may be made, depending on conditions. Bordeaux or Bungundy mixture is used of 1.5 per cent strength and is applied at the rate of 750 to 1000 liters per hectare. Increased yield from spraying is sufficient to pay the cost of application.—Brief discussion is given of resistant varieties.—*D. Reddick.*

REGULATORY MEASURES

1256. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. [Restrictive legislation and notices of quarantines in U. S. A.] *Service and Regulatory Announcements* 68: 52-111. 1920.—Correspondence relating to legislation in state of Texas with respect to pink bollworm of cotton shows some of the difficulties involved in enacting effective eradication provisions, especially when "states rights" are involved. The Texas and the Louisiana pink bollworm acts of 1920 are reproduced in full.—Notice of domestic federal quarantine 45 on account of gypsy moth and brown tail moth, with regulations. An extension of the area in which there are restrictions upon the movement of all forest and quarry products.—Notice of domestic federal quarantine 46 on account of pink bollworm of cotton with rules and regulations. This notice is also issued as an unnumbered leaflet by the U. S. Secretary of Agriculture.—Notice of quarantine 47 against Hawaiian and Porto Rican cotton, cotton seed and cotton products, with regulations. Previous quarantine restrictions are simply brought into one document.—List of current quarantine and other restrictive orders.—*D. Reddick.*

1257. FRIEDRICHS, K. **Zur Organisation des Koloniales Pflanzenschutzes.** [Organization of plant protection for the colonies.] *Tropenflanzer* 21: 311-322. 1918.

1258. LYNE, W. H. **Horticultural quarantine in B. C.** *Agric. Jour.* [British Columbia] 4: 132-133. 1919.—See Bot. Absts. 7, Entry 983.

1259. SCHOENE, W. J. **Partial report of inspection work during autumn of 1919 and spring of 1920.** *Quart. Bull.* 2: Virginia Crop Pest Commission. 4 p. 1920.—Of a total of 157,030 apple trees inspected during the period covered by the report slightly more than five per cent were discarded on account of crown-gall. The percentage of defective trees from various nurseries ranged from zero to as high as forty per cent. The details of the inspection are shown in tabular form, with the nurseries from which the shipments originated grouped by states. The apple stock which was grown in Virginia nurseries averaged 2.14 per cent affected with crown-gall, while that which originated without the state averaged 5.55 per cent.—*F. D. Fromme.*

MISCELLANEOUS (METHODS, COGNATE RESEARCHES, ETC.)

1260. ANONYMOUS. **Exhibition of diseases of the para rubber tree.** *Nature* 105: 86-87. 1920.—An exhibit of fungous diseases of *Hevea brasiliensis* in Ceylon and Malaya prepared by J. B. FARMER and opened March 10, at the Imperial Coll. Sci. and Tech. Several diseases are of great importance to the rubber industry. Principal diseases in exhibit: (1) Brown Bast, most important so far, perhaps of bacterial origin; (2) *Fomes lignosus* on roots, second in importance; (3) *Fomes pseudoferreus*, also on roots; (4) Dry Rot (*Ustilina zonata*), a wound parasite; (5) Patch Canker (*Phytophthora faberi*) a bark disease which is increasing; (6) Stripe Canker (*Phytophthora* sp.), affected 70 per cent of trees on some estates in 1915-17; (7) Pink Disease (*Corticium salmonicolor*).—*O. A. Stevens.*

1261. ANONYMOUS. **An Imperial Bureau of Mycology.** *Agric. News* [Barbados] 19: 30. 1920.—Reviews the report of the proceedings of the second meeting of mycological workers of India, at which a resolution was passed favouring the establishment of an Imperial Bureau

of Mycology to work along similar lines to the already existing Imperial Bureau of Entomology, for the identification of fungi, the publication of pathological literature, the establishment of a plant-pathology library, and the answering of enquiries of plant pathologists.—*J. S. Dash.*

1262. BOKURA, UMEÑOJO. A new bacterial disease of gypsy-moth caterpillars. *Ann. Phytopath. Soc. Japan* 13: 34-55. 1920.—[Following abstract is from English résumé, p. 55.] As a natural enemy of the gypsy-moth caterpillar (*Lymanthria Dispar* L.) this disease which is wide-spread in Japan is, together with a parasitic species of Hemiptera, playing a most important rôle in checking the spread of the insect. Appearing when the worm has reached its fourth or fifth moulting skin, the disease, "Nankwabyo," resembles the "Nankwabyo," a kind of "flacherie" of silk worms. It is caused by a new species of bacteria, *Bacillus Disparis* Hori and Bokura. The pathogene is rod-shaped, measures $1-1.3 \times 0.7-0.8$ microns, with 6 to 8 peritrichiate flagella. Endospores are not formed, and it is not discolored by the Gram's method. Konjak-medium is not liquefied. Fermentation is readily set up in dextrose, laevulose, saccharose, maltose, and galactose. Optimum temperature is $30^{\circ}-32^{\circ}\text{C}$. When fed to gypsy-moth caterpillars death ensues in from 1 to 8 days. It is non-pathogenic to silkworms, *Anomala rufocuprea* Motsch., *Pieris rapae* L., *Aphis* sp. on lily and *Hemcrophila atrilineata* Butl. on mulberry. It is recommended that sterilized water in which the bouillon or soy-bean cake decoction culture of the bacteria is mixed be sprayed on plants on which the worms are feeding, or else the body-fluid of the diseased caterpillars be used as spray material.—*L. M. Massey.*

1263. DICKSON, B. T. Report of the delegates to the Canadian Branch of the American Phytopathological Society. *Ann. Rept. Quebec Soc. Protection of Plants* 12: 24-27. 1920.—An account of the annual meeting held on December 11 and 12, 1919, at the Ontario Agric. Coll. A short summary of each address and paper is given.—*B. T. Dickson.*

1264. HORT, EDWARD C. The cultivation of aerobic bacteria from single cells. *Jour. Hygiene* 18: 361-368. 1 fig. 1920.

1265. HOXIE, FREDERICK J. Roof construction for factories with excessive moisture. *Amer. Architect* 115: 181-187. 20 fig. Jan. 29, 1919.—Rotting of roof planks and sweating can be prevented in a large part by improved design and construction. Chamfering off upper corners of wide beams would prevent the usual rotting off of roof planks above the beams. Ornamental moldings at the upper edges of the beams, and sheathing should be avoided. Insulation upon the outside of a roof should prevent precipitation of water within the plank. Such an insulated roof would consist of an outer creosoted plank and an inner untreated plank separated by waterproofed material. Insulation added to old roofs which have begun to decay should retard the destruction. Other means of assistance in preventing the rot in roofs are: insulation of skylights, drains, and ventilators to prevent radiation of heat; the proper placing of heating pipes to keep the roof dry and warm, and prevent circulation of moist air against cool roofs.—*Walter H. Snell.*

1266. HUDIG, J., AND C. MEYER. De Hooghalensche ziekte een nieuwe bodemziekte on zand—en veengronden. [The Hooghalen disease, a new soil disease on sand and peat soils.] 25 p. Den Haag: J. en H. van Langenhuysen, 1918.

1267. JONES, L. R., M. MILLER, AND E. BAILEY. Frost necrosis of potato tubers. *Wisconsin Agric. Exp. Sta. Res. Bull.* 46. 46 p., 1 colored pl., 12 fig. 1919.—Potatoes slightly frosted may be internally discolored when seemingly unaffected externally. Such injuries are termed "frost necrosis" and should be differentiated from other necrotic lesions, especially the non-parasitic but inheritable "net necrosis" and the parasitic types of "ring necrosis." The symptoms, which are described and figured in detail, include blotching and netted or ring discolorations of the interior tissues, and are more pronounced at the stem end than eye end of the tuber and in the vascular elements more than in the parenchyma. Experimental

chilling included trials in accurately controlled freezing chambers where the temperature could be dropped at any desired rate. There is variation in individual susceptibility of tubers; in general, frost necrosis appears following exposure to about $-10^{\circ}\text{C}.$ for 1 hour, -5° for 2 hours, or to slightly below -3° for several hours. While the actual freezing temperature is near $1^{\circ}\text{C}.$, super-cooling to -3° to -5° is necessary, the degree of this being greater with slow rate of temperature drop. The conditions of turning sweet and of freezing solid are also described. Neither variety, size, maturity, nor relative tuber turgidity seems to influence frost necrosis. Sprouts are relatively resistant, but start slowly. Therefore, it is not advisable to use frosted potatoes for seed. Frost necrosis symptoms are not inherited.—*R. E. Vaughn.*

1268. LEE, S. C. Electrical treatment of seed. *Agric. Gaz. Canada* 7: 248-249. 1920.—See Bot. Absts. 7, Entry 625.

1269. MANARESI, ANGELO. Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29, e 30 marzo 1918. [Damage to flowers of fruit trees by spring frosts and in particular the frosts of March 28, 29, and 30, 1918.] *Rev. Patol. Veg.* 10: 1-26. 1919.—See Bot. Absts. 7, Entry 986.

1270. MOORE, V. A. Principles of Microbiology. *8vo.* 506 p. New York, 1918.—A treatise on bacteria, fungi, and protozoa pathogenic to domesticated animals.

1271. NEGER, F. W. Die Rolle des Lichtes und Chlorophylls bei der Entstehung von Rauchschäden an grünen Pflanzen. [The rôle of light and of chlorophyll in the initiation of smoke injury to green plants.] *Zeitschr. Forst-u. Jagdw.* 48: 624-635. 1918.—Abst. in *Zentbl. gesamte Landw.* 1, Entry 445.

1272. RAYNER, M. C. Mycorrhiza and the Ericaceae. [Abstract.] *Rept. British Assoc. Adv. Sci.* 1919: 332. 1920.

1273. SMITH, ERWIN F. An introduction to bacterial diseases of plants. $2\frac{1}{2} \times 1\frac{1}{2}$ cm., XXX + 688 p. 453 fig. and frontispiece. W. B. Saunders Co.: Philadelphia, 1920.—“Manuscript of this book was completed for publication in 1915 and, in general, that year may be taken as the date of the outlook, but here and there, where it seemed most necessary, it has been revised down to the end of 1919.”—The book has been made primarily for laboratory use under the guidance of a competent teacher. It is the “result of 35 years of reading and 25 years of diligent laboratory and field investigation.”—Part 1 (75 p.) is a conspectus of bacterial diseases of plants under the topics: distribution, period of susceptibility, infection incubation, recovery from disease, transmission of pathogene, morphology and physiology, of parasite, action of parasite on host, host reaction, methods of control. Part 2 (56 p.) deals with technique: apparatus, culture media, isolation, inoculation, sectioning, staining, illustrating, cataloging, etc. Part 3 (341 p.) is devoted to an extended account of the diseases caused by the following organisms: *Bacillus tracheiphilus*, *Bact. campestre*, *Aplanobacter stewarti*, *Bact. solanacearum*, *Aplanobacter michiganense*, *Bacillus carotovorus*, *B. phytophthorus*, *Bact. phaseoli*, *Bact. maculicolum*, *Bact. malvacearum*, *Bact. mori*, *Bacillus amylovorus*, *Bact. savastanoi*, and *Bact. tumefaciens*. Part 4 (160 p.) deals with tumors, tumor formation, experimental teratoses. Part 5 (30 p.) contains suggestions for students about study, experimentation, interpretation, presentation, ethics, etc.—*D. Reddick.*

1274. WIELER, A. Rauchschaden bei Kokereien. [Smoke injury from coke ovens.] *Jahresb. Vereinig. Angew. Bot.* 16: 64-76. 1918.—Abstract in *Zeitschr. Pflanzenkr.* 30: 22-23. 1920.

1275. ZAVITZ, C. A. Systematic experiments. *Agric. Gaz. Canada* 7: 244-246. 1920.—See Bot. Absts. 7, Entry 684.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

1276. ANGERHAUSEN, J. Oxalsäure in Rhabarber und die Entgiftung von Rhabarberzubereitungen. [Oxalic acid and the detoxification of rhubarb products.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 81-87. 1920.—In rhubarb malic, citric and oxalic acids occur. The latter occurs in water soluble form in the leaves about twice as abundantly as in the stalk. Compotes, marmalades, etc. to which the rhubarb leaves were added have produced poisoning, especially in children. In adults 0.6 grams of free oxalic acid is said to suffice to deprive the blood of its protecting calcium. 200 grams of rhubarb leaves may contain 1.0 gram oxalic acid. In preparing rhubarb leaves one should add to the water 0.5-1 gram of calcium carbonate for every 100 grams rhubarb. Toxic effects are thus prevented.—*H. G. Barbour.*

1277. ANGERHAUSEN, J. Über Saft aus Rhabarberstielen. [Juice from rhubarb stalks.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 122-130. 1920.—A detailed chemical analysis. To de-acidify rhubarb juice, the addition of 0.25-0.35 per cent calcium carbonate is suggested which also detoxifies by removal of oxalic acid. As a preservative, 10 per cent alcohol or 0.25 per cent formic acid is suggested.—*H. G. Barbour.*

1278. ATKINSON, E. H. Weeds and their identification. New Zealand Jour. Agric. 20: 299-301. Pl. 1. 1920.—See Bot. Absts. 7, Entry 12.

1279. BAILEY, E. M. Food products and drugs. 1919. Part 1. Connecticut [New Haven] Agric Exp. Sta. Bull. 219: 209-259. 1919.—The work comprises the results of food and drug inspection for 1919, as required by State statute.—*Henry Dorsey.*

1280. COCKAYNE, L. An economic investigation of the montane tussock-grassland of New Zealand. New Zealand Jour. Agric. 20: 337-345. Fig. 1-7. 1920.—See Bot. Absts. 7, Entries 600, 601.

1281. GORIS, A., AND CH. VISCHNIAC. Caractères et composition du Priméverose. [Characteristics and composition of "primeverose."] Compt. Rend. Acad. Sci. Paris 169: 871-873. 1919.—See Bot. Absts. 7, Entry 1311.

1282. GREIG-SMITH, R. The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions. Proc. Linn. Soc. New South Wales 44: 311-347. Text-figs. 1-7. Tables 1-21. 1919. (See Bot. Absts. 5, Entry 801.) Eucalyptus oils are irregular in their action upon *B. coli communis*. Cineol begins to act in about one minute and a half; phenol, used as a standard of comparison, acts instantly. The curves of cineol and phenol cross in five minutes with a dilution of 1:75 at 20°. The phenol-coefficient of cineol in 15 minutes at 20° is 3.1, in 30 minutes 3.4; in 4 hours it declines to 2.8. Aromandendral is the most active of the constituents of the oils, with a phenol-coefficient of 21.1 in 30 minutes. Piperitone is the next most active. Pinene and sesquiterpene are low (0.8 to 0.5). The rectified oils of *E. cinerea* and *E. Smithii* are more efficient than the crude oils; in the case of the former this appeared to be due to the hydrolysis of the esters and subsequent oxidation of alcohols to aldehydes. Treatment with alkali did not reduce the efficiency of the acid rectified oils. Addition of acetic acid to crude oil doubled its germicidal powers in the course of 3½ months. (The addition of acid also increases germicidal activities in the case of phenol.) This activity is proportional in the oils of *E. cinerea* to the starch-iodide reaction and not to acidity, but this is not true for the oils as a class. The rectified oil of *E. polybractea* is less efficient than the crude oil. The oil of the Braidwood variety of *E. Australiana*, which grows on high ridges is the best and cheapest disinfecting oil (phenol-coefficient 5.8 in 30 minutes), the second best crude oil tested was that from *E. cneorifolia* (4.8 to 30 minutes).—*Eloise Gerry.*

1283. GRIEBEL, C. **Die mikroskopische Untersuchung der Tee- und Tabakersatzstoffe.** [Microscopy of tea and tobacco substitutes.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 225-299. 1920.—The author describes 67 substitutes.—*H. G. Barbour.*

1284. GRIEBEL, C. **Zur Anatomie der Lupinensamen.** [Lupine seeds.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 39: 297-299. 1920.

1285. MITCHELL, D. T. **Poisoning of cattle by feeding on ergotized Paspalum.** Jour. Dept. Agric. Union of South Africa 1: 422-426. 1920.—The cultivation of Paspalum on an extensive scale in Natal is of comparatively recent date, and in recent years it has been noted that in cattle which were allowed access to the Paspalum lands at a certain season, symptoms of incoordination of movement appeared. A large percentage of the Paspalum heads were found to be infected with *Claviceps Paspali*. From a series of experiments carried out at the Veterinary Research Laboratory it was noted that the initial symptoms appeared in each case on the second day after the infected heads were fed to the animals, and were characterized by muscular tremors, hypersensitiveness, increased glandular secretion and increases in respirations and pulse rate. These symptoms were rapidly followed by incoordination of movement, lack of tone of the leg muscles, loss of appetite and constipation. Recovery was noted to commence about the fifth or sixth day. Prophylactic measures consist of reaping and collection of the grass during the flowering season.—*E. M. Doidge.*

1286. SMITH, H. G. **On the essential oil of Boronia pinnata Sm. and the presence of Elemicin.** Proc. Roy. Soc. Victoria 32 (N. S.): 14-19. 1919.—The Boronias (*Rutaceae*), abundant in Australia, have flowers which are often strongly perfumed. The essential oil was distilled from *Boronia pinata* plants in full bloom. It was found that the principal constituent (about three-fourths or 70 per cent of the oil) is the trimethoxyphenol-ether, elemicin. This substance also occurs in the oil of Manila Elemi distilled from *Canarium commune* L. (*Burseraceae*), but this is the first time that elemicin has been detected in the oil of Australian plants. The odor of the crude oil suggests geraniol. Details of the distillation and analysis are given.—*Eloise Gerry.*

1287. SMITH, E. PHILIP. **Plant Dermatitis II.** Jour. Botany 58: 173-176. 1920.—The symptoms and treatment of lacquer poisoning are given. It is noted that this type of poisoning is not common in England, but is very frequent in Japan and China where the lacquer industry is considerable. Lacquer is made from the juice of *Rhus vernicifera*. Confectioners often suffer from vanilla dermatitis, which is probably due to oil of Cashew. The dust from certain fine woods often irritates the skin or mucus membrane of workers in these woods, as satinwood, teak, ebony, rosewood, olive-wood, box, coco-wood, and partridge-wood. The poisonous substances are apparently normal products of metabolism in the plant, and are only by accident discovered to be poisonous. The biological significance of the poison must be worked out with care to avoid hasty inferences. From the point of view of human contact there are two types of substances: one soluble in water (e.g. nettle), the other of oily nature (*Rhus*). Specially sensitive skin may be affected by almost any combination of rough hairs with exuded cell-sap. Personal idiosyncrasy plays a very important part in dermatitis. A list is given of forty-two plants known to cause dermatitis, and a bibliography of the subject is appended.—*K. M. Wiegand.*

1288. SIMPSON, JOSÉ AGUSTIN. **Estudio sobre el ácido cianhidrico en el "Phaseolus lunatus" (Frijol de Birmania).** Discurso de recepción como académico de número. [Study on hydrocyanic acid in *Phaseolus lunatus* (Birmania bean). Address delivered on becoming a member of the academy.] An. Acad. Cien. Habana—Rev. Cien. 60: 250-283. 10 fig. 1919.—A number of varieties of beans of the species *Phaseolus lunatus* which are imported into Cuba in considerable quantities were studied. These are known commercially as Java, Birmania, Rangoon, Lima, or Burma beans. Considerable variety in color pattern is shown; one of the most poisonous varieties is described as of a rather pale yellowish color, mottled with gray or lilac spots or bands, elongated parallel to the dorsal portion of the seed.—The

poisonous principle of the beans is due to the glucoside "Phaseolunatina," $C_{10}H_{17}O_6N$, which by hydrolysis forms among other products hydrocyanic acid. This highly toxic principle occurs in enormous quantities in uncultivated varieties of *Phaseolus lunatus*, the amount varying from 65 to 320 milligrams in 100 grams of beans. In cultivated, improved varieties the poison is produced in hardly appreciable amounts. Histological studies were made of these beans and it was found that they could be readily distinguished from ordinary beans (*Phaseolus vulgaris*) by the form of certain cells of the seed coat and the absence in these of crystals of oxalate of lime.—Prolonged boiling never completely removes the poison but as boiling water dissolves the "Phaseolunatina" without destroying it, the decoction is as dangerous as are the beans themselves. It is only by means of delicate chemical tests that it is possible to positively distinguish the poisonous from the improved varieties. The glucoside in question is acted upon by various elements; among these the enzymes contained in the beans in the presence of moisture, so that if the cells containing the glucoside are broken and this comes in contact with the ferments, the reaction resulting in the formation of hydrocyanic acid takes place. The hydrolysis is much more active if water is then added, resulting in a much more rapid formation of the poison. This fact is taken advantage of in determining the amount of hydrocyanic acid contained in the beans. A rapid method of quantitative analysis is described in detail. The hydrocyanic acid in the distillate is determined by the gravimetric, volumetric, or colorimetric method, the volumetric method of Liebig being especially rapid. Another method of determining the poison contained in these beans is described, this being based on the transformation of hydrocyanic acid into sulpho-cyanic acid. By this process it is possible to determine quantities as small as 0.00001 HCN. Among the varieties of beans studied only one, the "White Rangoon" was found to produce more than 40 milligrams of hydrocyanic acid in 100 grams of the product. Other types of Rangoon and Burma beans produced only 3 to 8 milligrams of the poison. In addition to these beans, a large number of other varieties were analyzed, negative results being obtained in all, including the Lima bean in which no traces whatever of the poison were found. More than 80 analyses were made. The remainder of the paper deals with consideration of legislation relating to the sale for food purposes of the poison producing varieties of this bean. In France beans containing 20 grams HCN are considered fit for food. The author recommends that the amount of poison admissible should be less than that of the French legislation.—S. C. Bruner.

1289. WATTIEZ, N. Contribution à l'étude *Polygonum Bistorta* (L.) Localisation du tanin. Son emploi comme succédané du *Krameria Triandra* (Ruiz et Pavon). (Contribution to the study of *Polygonum Bistorta*. Localization of tannin. Its employment as a substitute for *Krameria triandra*.) Ann. & Bull. Soc. Roy. Sci. Med. & Nat. Bruxelles. 4: 121-128. 1920.—In Belgium, during the war, the use of Cod Liver Oil being prohibited as a food and tonic, the iodo-tannic syrup was prescribed frequently. The want of Rhatany necessitated the search for an indigenous substitute. This has been found in the rhizome of *Polygonum Bistorta* which contains 15 to 18 per cent of tannin.—Henri Micheels.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Associate Editor*

PROTOPLASM, MOTILITY

1290. HERLANT, M. Le cycle de la vie cellulaire. Recherches physiologique sur la division de la cellule. (Note préliminaire.) [The life cycle of the cell. Physiological investigations on cell division.] Ann. et Bull. Soc. Roy. Sci. Med. et Nat. Bruxelles 4: 112-117. 1920.—See Bot. Absts. 7, Entry 731.

1291. MACDOUGAL, D. T., AND H. A. SPOEHR. **The components and colloidal behavior of plant protoplasm.** *Proc. Amer. Phil. Soc.* 59: 150-170. 1920.—The authors give summarized statements of investigations on biocolloids previously published. Newly obtained results are given for (1) the proportions of carbohydrate and albuminous matter in a colloid of the highest hydration capacity; (2) the substances or ions of biological significance which would raise the hydration capacity of these phytocolloids to the highest limit; (3) measurement of the relative effects of some metallic bases upon a carbohydrate colloid; and (4) determination of the amplitude and continuance of alternating or repeated effects of renewed or replaced solutions. The highest swelling of pentosan-protein mixtures is that of agar 1, gelatine 3, in hundredth normal acid; such colloids are, however, unusual in the plant. Colloids in which the carbohydrate and albuminous components each vary in forming 30-60 per cent of the total and showing high hydration capacities in the hydroxides, in glycocoll and in water, furnish an analogue of living matter of proved similarity of composition and action. Biocolloids containing more carbohydrate than albuminous matter would be most sensitive to the presence of hydrogen ions, and their growth would be markedly limited by acidity. All types of biocolloid would respond by increased hydration to the presence of amino acids, as shown by relative swellings in glycocoll and in histidine. Mixtures consisting of 40-60 per cent of the two main components are seen to give the highest swelling values in histidine yet obtained for biocolloids by treatment with any reagent. Alkaline hydroxides may cause a swelling of agar greater than in water, as in the case of experiments with amino acids. The stronger the base as indicated by its position in the electromotive series, the more it restricts hydration. The inclusion of a substance or ion in a colloidal structure results in hydration relations of a different character from those which appear when the substance in question is presented in the hydrating solution. Unequal expansion in all directions of dried sections of colloids when immersed in solutions was again observed.—*Wanda Weniger.*

DIFFUSION, PERMEABILITY, ADSORPTION

1292. ANDRÉ, G. **Sur l'exosmose des principes acides et sucrés de l'orange.** [Exosmosis of the acids and sugars of the orange.] *Compt. Rend. Acad. Sci. Paris* 170: 1199-1203. 1920.—A comparison is made of the rate of diffusion of acids and sugars through the cells of intact quarters of oranges immersed in distilled water and in sugar or salt solutions respectively. Sugar and acid are found to leave the cells in about equal proportions, the ratio of sucrose to reducing sugars remaining approximately constant, though a considerable inversion of sucrose occurs during exosmosis.—*C. H. Farr.*

1293. BRADFORD, S. C. **Adsorptive stratification in gels.** *Biochem. Jour.* 14: 29-41. *Pl.* 2. 1920.

1294. BRADFORD, SAMUEL CLEMENT. **Adsorptive stratification of gels. IV.** *Biochem. Jour.* 14: 474-482. *Pl.* 7-8, 1 *fig.* 1920.

1295. LLOYD, DOROTHY JORDAN. **On the swelling of gelatin in hydrochloric acid and caustic soda.** *Biochem. Jour.* 14: 147-170. 7 *fig.* 1920.

1296. STILES, WALTER. **I. The penetration of sodium chloride into gels of agar-agar, containing silver nitrate.** *Biochem. Jour.* 14: 58-72. 4 *fig.* 1920.—Agar containing silver nitrate is employed as the gel, and the progressive penetration of sodium chloride is observed by the precipitation of silver chloride. Such penetration is found, within wide limits, to be proportional to the square root of the time and is a constant for any particular gel and any particular concentration of penetrating salt. The rate of penetration depends upon (1) the initial concentration of the penetrating salt, and (2) the concentration of silver nitrate. The concentration of the gel has little influence. An empirical relation is found between penetration, time, and penetrating salt.—*Alva R. Davis.*

WATER RELATIONS

1297. RIVETT, MAUD F. The anatomy of *Rhododendron ponticum*, L., and of *Ilex aquifolium*, L., in reference to specific conductivity. Ann. Bot. 34: 525-550. 1920.—The series of studies on the anatomy of woods in relation to water-conducting efficiency is here continued in connection with the evergreen holly and *Rhododendron*. Sections were cut at many places throughout the length of several different shoots and the following points determined: (1) total area of wood, (2) total area of cavities, (3) percentage of wood occupied by cavities, (4) average area of cavities, and (5) number of cavities per sq. mm. Curves are given to show the variation, with respect to each of these points, from base to tip of the shoots. The results obtained for these two species and for the ash and hazel in previous studies are compared. And the results in all four cases are correlated with those of experiments on water conductivity. All four agree in showing a general decrease in absolute conductivity from base to tip, and an increase in specific conductivity up to a certain point followed by a decrease. The difference in specific conductivity between the two evergreens is in agreement with the difference in percentage of wood occupied by cavities. This is also true in the case of the two deciduous forms. But the specific conductivity of the deciduous forms is higher than that of the evergreens, though the percentage of wood occupied by vessels is smaller. This difficulty is explained by reference to the greater length of the vessels in the deciduous species and the difference in the nature of their perforations.—W. P. Thompson.

1298. STEEL, T. On water from the roots of the red mallee (*Eucalyptus oleosa*). Proc. Linn. Soc. New South Wales. 44: 348-352. 1919.—Water was obtained from the water-storing roots of *E. oleosa* by cutting lengths of roots and allowing them to drain. It was colorless, practically tasteless, and darkened with age and exposure to air. It contained 66.60 parts per 100,000 of total solids, 24.20 of which were salts and 42.40 organic matter, chiefly tannin. Soda (Na_2O) and chlorine were found to be high in relation to the other ingredients. Some mallee soil analyses also showed considerable concentration of these substances. It is thought that the root water may be a reserve supply held in special vessels and used during drought.—Eloise Gerry.

MINERAL NUTRIENTS

1299. MORITA, KOICHI, AND BURTON E. LIVINGSTON. Some solution cultures of wheat without potassium. Bot. Mag. Tokyo 34: 71-90. 1 fig. 1920.—Nutrient solutions without potassium produced very satisfactory growth of wheat seedlings for three weeks. About 90 different three-salt solutions were used in which the total concentration of the salts corresponded to about one atmosphere of osmotic pressure. All of these solutions were without potassium, and of these the ones with the lower concentrations of the di-hydrogen phosphate produced the best plants.—O. L. Sponsler.

PHOTOSYNTHESIS

1300. BRIGGS, G. E. Experimental researches on vegetable assimilation and respiration. XIII. The development of photosynthetic activity during germination. Proc. Roy. Soc. London B, 91: 249-268. 1920.—Leaves were kept in an atmosphere of hydrogen, supplied with carbon dioxide, and the oxygen removed as fast as formed. This permits measurement of photosynthesis and maintenance of uniform amount of chlorophyll for considerable periods. Photosynthetic activity lags behind formation of chlorophyll, indicating some additional internal factor as the limiting one. This internal factor increases with age, so that with equal greenness in two leaves, a few days difference in age causes increased activity. Willstätter's failure to confirm the findings of Irving that young, fully green leaves might show no activity is due to the fact that he used leaves considerably older. A provisional conception of photosynthesis as consisting of diffusion, photochemical, and chemical stages is advanced as a means of analyzing limiting factors under various conditions.—Paul B. Sears.

1301. FISHER, HUGO. *Pflanzenwuchs und Kohlensäure*. [Plant growth and carbonic acid.] *Naturwissenschaften* 8: 413-417. 1920.—The fact that CO₂ may be present in minimum quantity and thus be the limiting factor in plant growth is first pointed out. Then reference is made to the possibility that CO₂ present in the air may be increased by the CO₂ formed through the activity of the soil organisms. A review is given of his own and other experiments where the amount of CO₂ in the air is increased with resulting increase in growth as well as flower and fruit production. A practical application on a large scale is noted where the waste gases (containing about 5 per cent CO₂) produced in a certain steel mill were added to greenhouse and field cultures with favorable results.—Orton L. Clark.

METABOLISM (GENERAL)

1302. ANDERSON, R. J. Occurrence of inosite hexaphosphoric acid in the seed of the silver maple (*Acer saccharinum*). *Jour. Biol. Chem.* 43: 469-475. 1920.—The principal organic phosphorus compound of maple seed is identical with the inosite hexaphosphoric acid which has been isolated from other plant material. Freshly powdered maple seed apparently do not contain any active phytase.—G. B. Rigg.

1303. ANONYMOUS. Coloring matters of plants. *Nature* 105: 139-140. 1920.—A popular summary regarding nature and distribution of such pigments.—O. A. Stevens.

1304. BORNEMANN. Die organische Ernährung bei höheren grünen Pflanzen. [Organic nutrition of higher green plants.] *Naturwissenschaften* 8: 496-497. 1920.—This corrects a statement by CZAPEK in an article of the above title appearing in Heft 12, 1920, of this journal to the effect that the CO₂ from the soil does not have an influence on plant growth. The original quotation from MOLLIARD is given, in which he states that CO₂ from soil organisms does have an appreciable effect on plant growth, which CZAPEK incorrectly translated.—Orton L. Clark.

1305. BOTTOMLEY, W. B. The effect of organic matter on the growth of various water plants in culture solution. *Ann. Bot.* 34: 353-364. 1920.—To determine the necessity of organic matter for the growth of water plants in particular, and all plants in general, plants of *Lemna major* collected in May were grown in 150 cc. quantities of the following solutions: (1) Detmer's solution; (2) nucleic acid from raw peat, 1 gm. to 500 cc. water; (3) autoclaved *Azotobacter* 1 gm. to 1000 cc. water; and (4) water extract of bacterized peat, 1 gm. to 500 cc. water. One hundred freshly collected plants averaged 24.8 mg. in weight. After 3 weeks, (1) averaged 20.4 mg.; (2) 44.8 mg.; (3) 47.2 mg.; and (4) 46.5 mg. With (1) and (4) *Lemna major* collected in July, also *Salvinia natans*, *Azolla filiculoides*, and *Limnobium stoloniferum* showed similar results. The amount of organic substances in the medium was only 184 parts per million as compared to 5500 parts for nutrient salts; hence organic substances are not of nutrient value, but enable the plants to make full use of the nutrient salts. These results in conjunction with earlier ones indicate the necessity of a small quantity of organic substance for normal growth.—F. S. Wolpert.

1306. CAREY, CORNELIA LEE. A method of preparation and some properties of a starch gel. *Bull. Torrey Bot. Club* 47: 455-463. 1920.—A starch gel was prepared by mixing 100 grams of commercial corn starch with 150 cc. of distilled water, pouring into Petri dishes, and treating in the autoclave for thirty minutes at from 105° to 110°C. When still warm the starch was cut into strips and dried. The properties of this gel, its adsorptive powers, and its microscopic structure are discussed.—P. A. Munz.

1307. CZAPEK, FRIEDRICH. Die organische Ernährung bei höheren grünen Pflanzen. [The organic nutrition of the higher green plants.] *Naturwissenschaften* 8: 226-231. 1920.—A review is given of data concerning various organic substances found in the soil and their absorption by the green plant. The carbon and nitrogen requirements of the higher plants, also the methods of culture used in testing the value of organic compounds, are described

and the difficulties pointed out. The taking up of colloidal substances by the roots is referred to. The author considers it still undecided as to whether or not the roots are able to secrete ferments acting on substances in the soil and rendering them available for absorption. Mycorrhiza and the competition of various soil organisms are also briefly discussed. Important recent French and American results are not included.—*Orton L. Clark.*

1308. EWART, A. J. On the synthesis of sugars from formaldehyde, carbon dioxide and water. *Proc. Roy. Soc. Victoria N. S.* 31: 379-387. 1919.—The polymerization of formaldehyde to sugar by alkalies and alkaline carbonates was investigated. The main conditions for a high proportion of sugar were appropriate dilution and high temperature (100° to 110°C.). The byproducts were formates and methyl alcohol. The most rapid reaction was produced by sodium hydrate. In the presence of a neutral calcium salt, the amount of sugar condensation was greatly increased, less alkali was required, and less formate produced. Neutral barium and strontium salts were less effective as condensing catalytic agents. The sugar mixture is optically inactive, and contains reducing pentoses and reducing fermentable hexoses. Carbon dioxide and water are readily polymerized to sugar by the aid of magnesium.—*Eloise Gerry.*

1309. FREUDENBERG, K. Über Gerbstoffe 4: Peters, D. Hamameli Tannin (II). [Concerning tannin 4: Peters, D. Hamameli tannin (II).] *Ber. Deutsch. Chem. Ges.* 53: 953-961. 1920.—Evidence is presented to show that the crystalloidal tannin obtained from *Hamamelis* contains a previously unknown sugar closely related to the hexoses.—*Henry Schmitz.*

1310. FRIEDMANN, W. G. The carbohydrates of the pecan. *Jour. Amer. Chem. Soc.* 42: 2286-2288. 1920.

1311. GORIS, A., AND CH. VISCHNIAC. Caractères et composition du Priméverose. [Characteristics and composition of "primeverose."] *Compt. Rend. Acad. Sci. Paris* 169: 871-873. 1919.—Two glucosides isolated from *Primula officinalis* Jacq.—"Priméverine," and "primula-verine," respectively—on hydrolysis by a specific enzyme—"primeverase"—yield among other products a "biose" which the author calls "primeverose." The chemical and physical characteristics of this substance were studied at length. It was found to have among other properties the power to reduce Fehling's solution and when hydrolysis was effected by means of sulphuric acid the resulting mixture yielded osazones of glucose and xylose. The author concludes that "primeverose" is a biose built up from xylose and glucose.—*V. H. Young.*

1312. JUDD, HILDA M. The iodometric estimation of sugars. *Biochem. Jour.* 14: 255-262. 1920.—A modification of the iodometric sugar method of Colin and Lievin, and that of Willstätter and Schudel, is devised, the basis of which is the fact that a constant weight of iodine always reacts with a given weight of sugar, and that this weight of iodine is not affected by changes in the amount of alkali present, or by the presence of other sugars in the solution. The author makes special application of the method to the estimation of sugars in fruit juices.—*Alva R. Davis.*

1313. KAULFERSCH, F. Über die Bestimmung von in Zellmembranen eingeschlossener Stärke mit Hilfe von Kupferoxydammoniak. [Determination of the starch enclosed in cell membranes by means of copper ammonium oxide.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 39: 344-346. 1920.

1314. KLASON, P. Über Lignin und Lignin Reaktionen. [Concerning lignin and lignin reactions.] *Ber. Deutsch. Chem. Ges.* 53: 706-711. 1920.—Experiments dealing with the chemical reactions of lignin indicate that the lignin molecule contains coniferyl aldehyde. The action of sodium sulphite on lignin is thus explained.—*Henry Schmitz.*

1315. LAFORGE, F. B. Sedoheptose, a new sugar from *Sedum spectabile*. II. *Jour. Biol. Chem.* 42: 367-374. 1920.

1316. MACLEAN, IDA SMEDLEY, AND ETHEL MARY THOMAS. The nature of yeast fat. *Biochem. Jour.* 14: 485-493. 1920.

1317. MILLER, ELIZABETH W. The effect of cooking on the water-soluble vitamine in carrots and navy beans. *Jour. Biol. Chem.* 44: 159-173. 1920.—Cooking carrots for 30 minutes at 100°C. caused no reduction in the vitamine. Cooking navy beans at 120° for 30 minutes decreased the vitamine content 40.6 per cent.—*G. B. Rigg.*

1318. MOCKERIDGE, FLORENCE ANNIE. The occurrence and nature of the plant growth promoting substances in various organic manurial composts. *Biochem. Jour.* 14: 432-450. 1920.—*Lemna major* was grown in Knop's solution to which were added small amounts of extracts from leaf mould, fresh and old manure, bacterized peat, etc. Cultures to which such extracts were added gave better growth than that of the control in Knop's solution alone. The author concludes that there are organic extractables in such materials, probably formed by bacterial action, which are beneficial to plant growth. A chemical study of such extracts showed all to contain nucleic acids and derivatives, and these are concluded to play an important rôle as auximones.—*Alva R. Davis.*

1319. MOORE, BENJAMIN, AND T. ARTHUR WEBSTER. Studies of photosynthesis in fresh-water algae.—1. The fixation of both carbon and nitrogen from the atmosphere to form organic tissue by the green plant cell. 2. Nutrition and growth produced by high gaseous dilutions of simple organic compounds, such as formaldehyde and methylic alcohol. 3. Nutrition and growth by means of high dilution of carbon dioxide and oxides of nitrogen without access to atmosphere. *Proc. Roy. Soc. London B*, 91: 201-215. 1920.—The authors present reasons for thinking the earliest organisms could utilize both inorganic carbon and nitrogen, and that bacteria are later, specialized types. They indicate that the first synthetic agencies were inorganic colloids, utilizing shorter wave lengths of light. They also outline careful culture experiments showing that green algae, (a) if supplied with carbon dioxide, will grow and fix atmospheric nitrogen; (b) will exhibit fixation and growth much faster if supplied with nitrites or oxides of nitrogen in addition to carbon dioxide; and (c) can utilize extremely dilute solutions of formaldehyde and methylic alcohol as sole sources of carbon. Oxides of nitrogen are available in pure country air.—*Paul B. Sears.*

1320. NIERENSTAIN, M. Waage's phytochemical synthesis of phloroglucin from glucose. *Nature* 105: 391. 1920.—The author states that he has tried the experiment (floating leaves in sugar solutions exposed to sunlight) nearly eighty times in the last fifteen years without success.—*O. A. Stevens.*

1321. PRINGSHEIM, H. Über das Vorkommen optischer Antipoden in der Natur. [Concerning the occurrence of optical antipodes in nature.] *Ber. Deutsch. Chem. Ges.* 53: 1372-1374. 1920.—A critical discussion of the work of Hesz.—*Henry Schmitz.*

1322. RAISTRICK, HAROLD, AND ANNE BARBARA CLARK. On the mechanism of oxalic acid formation by *Aspergillus niger*. *Biochem. Jour.* 13: 329-344. 1919.—*Aspergillus niger* was grown on synthetic media with Na, NH₄, or Ca salts of organic acids as sources of carbon, and the quantity of oxalic acid produced was estimated. The carbon sources behaved as follows in reference to growth and acid production: (1) Four-carbon dibasic acids gave good growth and good yield of oxalic acid; (2) four-carbon monobasic acids gave almost no yield and no oxalic acid; (3) three-carbon acids gave very good growth and either no yield or small yield of acid; (4) two-carbon acids, as acetic, gave good growth and yield of acid, while glycollic and glyoxalic acids gave but fair growth and no acid; (5) the one-carbon acid, formic, gave fair yield and no oxalic acid. A theoretical scheme is suggested to represent the breakdown of sugar to oxalic acid. This involves the intermediate formation of β - δ -di-keto-adipic acid which hydrolyses to acetic and oxalic, the acetic in each case oxidizing to oxalic.—*Alva R. Davis.*

1323. ROSENHEIM, OTTO. Note on the use of butyl alcohol as a solvent for anthocyanins. *Biochem. Jour.* 14: 73-74. 1920.—The author finds butyl superior to amyl alcohol as a solvent for anthocyanin, the former removing all the anthocyanins, (mono- and rhamno-glucosides, as well as normal glucosides) while in the latter the first two groups of glucosides alone are soluble to any great extent. The method of extraction with this solvent is described.—*Alva R. Davis.*

1324. ROSENHEIM, OTTO. Observations on anthocyanins. I. The anthocyanins of the young leaves of the grape vine. *Biochem. Jour.* 14: 178-188. 1 fig. 1920.—The red pigment of the grape was isolated in crystalline form and found to be probably identical with oenidin, the non-glucosidic component of the purple grape. The occurrence of a colorless modification of the pigment was demonstrated, present in combination possibly with a carbohydrate or other complex and is converted into anthocyanidin by strong acids. The European species, *Vitis vinifera*, seems the only member of the genus to produce free anthocyanidin, and the bearing of this on genetic problems is discussed.—*Alva R. Davis.*

1325. SCHOORL, N. Zur Titration von Zuckerarten. [Titration of sugars.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 39: 180-182. 1920.

1326. SIMPSON, JOSÉ AGUSTIN. Estudio sobre al ácido cianhídrico en el *Phaseolus lunatus* (Frijol de Birmania). Discurso de recepción como académico de número. [Hydrocyanic acid in *Phaseolus lunatus* (Birmania bean). Address delivered on becoming a member of the Academy.] *An. Acad. Cien. Habana—Rev. Cien.* 55: 250-283. 10 fig. 1919.—See *Bot. Absts.* 7, Entry 1288.

1327. VENN, ELFRIDA C. V. The influence of reaction on colour changes in tyrosine solutions. *Biochem. Jour.* 14: 99-102. 1 fig. 1920.—This study has to do with the effect of varying degrees of acidity and alkalinity upon colors produced by one strain of bacteria upon a single amino acid.—*Alva R. Davis.*

1328. WHIPPLE, BERTHA K. Water-soluble B in cabbage and onion. *Jour. Biol. Chem.* 44: 175-187. 1920.—Not more than one-half the water-soluble B is lost in the cooking water from cabbage or from onions boiled for 30 minutes.—*G. B. Rigg.*

METABOLISM (NITROGEN RELATIONS)

1329. AMMANN, P. Sur la grande richesse en matières azotées de certains maniocs du Cambodge. [On the large amount of nitrogenous matter in certain Cassavas of Cambodge.] *Compt. Rend. Acad. Sci. Paris* 170: 1333-1334. 1920.—It is found that the amount of nitrogen compounds in these varieties is 2.93 per cent to 7.43 per cent as compared with the varieties of other localities which yield only 0.74 per cent to 1.49 per cent.—*C. H. Farr.*

1330. BEZAGU, MAURICE. Variations de la respiration des cellules de feuille avec l'âge. [Variations in the respiration of cells of the leaf with age.] *Compt. Rend. Acad. Sci. Paris* 169: 701-702. 1919.—Studies were made on the leaves of *Robinia pseudacacia*, *Pinus silvestris*, *Coboea scandens*, *Ligustrum vulgare*, *Althaea*, *Loroglossum hircinum*, and *Cercis siliquastrum*. Respiration, which is very weak in the young leaf, increases to a maximum which corresponds to the period at which the leaf reaches its full development. As the leaf becomes still older, the intensity of its respiration decreases.—*V. H. Young.*

1331. BOTTOMLEY, W. B. The effect of nitrogen-fixing organisms and nucleic acid derivatives on plant growth. *Proc. Roy. Soc. London B*, 91: 83-95. 1920.—The author has previously shown that *Lemna minor* grows much better when an extract of bacterized peat is added to inorganic nutrients, and in this investigation he tries to determine the factors responsible. Autoclaved growth masses of *Azotobacter chroococcum* added to Detmer's solution caused greatly increased growth and dry weight of plants over those grown in unmodi-

fied Detmer's solution. The same was found true when similar material of *Bacillus radicola* was added. Similar results were obtained by use of crude nucleic acid derivatives from peat, but the pure adenine-uracil fraction was much less efficient. Neither the ash of nucleic acid derivatives nor of *Azotobacter* is effective in producing growth increase.—Paul B. Sears.

1332. LAMPITT, LESLIE HERBERT. **Nitrogen metabolism in *Saccharomyces cerevisiae*.** Biochem. Jour. 13: 459-486. 3 fig. 1919.—The writer considers (1) factors which influence assimilation of nitrogen by yeast; (2) mechanism of the extraction of nitrogen from amino acids by yeast; (3) influence of available amino-acids and sugars on nitrogen assimilation; (4) apparent excretion of nitrogen by yeast. Under (1) he finds that active reproduction may result in a lowering of the nitrogen coefficient and that the final nitrogen coefficient is independent of the initial one. Under the second heading he finds the amidase described by Effront produces a non-volatile as well as a volatile acid. His third point of attack discloses that fermentative activity stimulates nitrogen assimilation, and desamination may continue after zymatic activity ceases. Excessive zymatic activity does not insure rapid N-assimilation. And fourth, during fermentation, the yeast constantly loses nitrogen to the liquid. Such nitrogen may be used again. An increase in sugar available for fermentation increases the rate of nitrogen excretion.—Alva R. Davis.

1333. MAZÉ, P., VILLA, AND LEMOIGNE. **Action de la cyanamide et de la dicyanodiamide sur le développement du maïs.** [Action of cyanamide and dicyanodiamide on the development of maize.] Compt. Rend. Acad. Sci. Paris 169: 804-807. 1 fig. 1919.—Experiments in France, Italy and Germany have shown that results from the use of calcium cyanamide are very variable. Certain authors have held that calcium cyanamide has a toxic effect, delaying the germination of seeds, while others hold that dicyanodiamide, a product of the polymerization of cyanamide, is the toxic agent. The effects of cyanamide and dicyanodiamide were tested with purified chemicals in culture media of definite composition. Cyanamide hinders the germination of maize at the concentration of 0.168 grams per liter both when added to solutions of nutrient minerals and when added to distilled water; dicyanodiamide on the other hand was found to be without effect. It was further shown that neither of the two substances under consideration is capable of serving as a source of nitrogen for maize.—V. H. Young.

1334. MAZÉ, P., VILA, AND LEMOIGNE. **Transformation de la cyanamide en urée par les microbes du sol.** [Transformation of cyanamide into urea by micro-organisms of the soil.] Compt. Rend. Acad. Sci. Paris 169: 921-923. 1919.—A previous note by the authors showed that pure cyanamide is very toxic to higher plants. The authors have isolated from the soil six species of bacteria among which are *Bacillus prodigiosus*, *B. coli*, and *B. cloacae*, which flourish in the presence of cyanamide in the proportion of 1-1000.—Cultures of these bacilli in bouillon were tested for their effect on cyanamide, and it was shown that while *B. coli* and one of the strains of *B. cloacae* do not break down cyanamide, the other species break it down with the formation of urea and in the absence of cyanamide urea was not formed. Traces of ammonia were produced in most cases of cyanamide decomposition. Further experiments with a miscellaneous collection of bacteria from milk, soil and dung showed that they did not break down cyanamide nor form urea except in the case of certain forms of *B. cloacae* and *B. subtilis*. *Penicillium glaucum* and two species of yeasts were shown to have the power of breaking down cyanamide and forming urea. The authors conclude that cyanamide may be transformed into urea by many soil organisms and this transformation should be rapid except in acid soils.—V. H. Young.

1335. WANN, F. B. **The fixation of nitrogen by green plants.** Science 51: 247. 1920.—In the experiments recorded here seven species of grass-green algae were used, all except one being isolated from soil and grown in pure culture. The cultures were made in 500 cc. flasks on approximately 150 gm. of accurately weighed mineral nutrient agar. The full nutrient solution contained 0.5 gm. NH_4NO_3 per liter, and in the various series this source was replaced by $(\text{NH}_4)_2\text{SO}_4$, $\text{Ca}(\text{NO}_3)_2$, asparagin, glycocoll, urea. In all cultures nitrogen as such was present in approximately equal quantities, and each nitrogen source was set up in duplicate

series, with and without 1 per cent glucose. NH_4NO_3 , $\text{Ca}(\text{NO}_3)_2$, and $(\text{NH}_4)_2\text{SO}_4$ were also used in the presence of mannite. At the end of from 5 to 7 months the cultures were analyzed for total nitrogen, the Gunning-Kjeldahl method being used for media free from nitrates, and the Förster modification where nitrates were present. In the urea, glycocoll, asparagine and $(\text{NH}_4)_2\text{SO}_4$ series no marked increase or decrease occurred either in the presence or absence of glucose or mannite. Marked increases were found in NH_4NO_3 and $\text{Ca}(\text{NO}_3)_2$ media in the presence of glucose, the amount of fixation ranging from 6 to 10 mgm. per culture in the 1917-1918 experiments and from 4 to 13 mgm. in the 1919 experiments. This represented an increase in total nitrogen ranging from 17 to 55 per cent. Fixation was common to all species. The amount of fixation varied somewhat with the different species and seemed to be related to the intensity of growth.—A. H. Chivers.

1336. WARBURG, OTTO. Über die Reduktion der Salpetersäure in grünen Zellen. [The reduction of nitric acid in green cells.] *Naturwissenschaften* 8: 594-596. 1920.—Little is known of the conditions of reduction in higher plants as it is usually covered up by the oxidation processes. Warburg has succeeded, however, in increasing the rate of reduction to such an extent that the chemical nature of the process can be studied. He used in his experiments the alga *Chlorella vulgaris* Beyerinck and by growing it in dilute solutions of nitric acid was able to stimulate the reduction of nitrates to such an extent that in darkness the reduction made up 55 per cent of the entire metabolism, and in light a much greater part, without injurious effect on the alga.—Orton L. Clark.

METABOLISM (ENZYMES, FERMENTATION)

1337. COLIN, H. L'inulase du Topinambour. [The inulase in Jerusalem artichoke.] *Rev. Gen. Bot.* 32: 247-255. 1920.—The author finds that the tubercles of Jerusalem artichoke are not an exceptionally good source of inulase. COLIN finds that "helianthenine" is not a stage in the breaking down of inulin, and in this he disagrees with GREEN.—J. M. Brannon.

1338. COLIN, H. Sur l'inversion diastasique du saccharose; influence des produits de la réaction sur la vitesse d'hydrolyse. [On the diastatic inversion of saccharose: the influence of the products of the reaction on the rate of hydrolysis.] *Compt. Rend. Acad. Sci. Paris* 169: S49-S52. 1919.—The author has previously shown that diminution of the rate of reaction of invertase with increase in the amount of saccharose present is to be imputed to increased viscosity of the solution and that the rate of reaction is a linear function of the fluidity of the solution. In order to determine the specific effect of the end products of the inversion of saccharose on the rate of inversion, invert sugar, levulose, and glucose were added to mixtures of saccharose and invertase and their effect on the rate of reaction was noted. It is concluded that the rate of hydrolysis of saccharose is primarily a function of the fluidity of the solutions, and the retarding effect of glucose, levulose, and invert sugar on this rate is attributed to the augmentation of the viscosity of the medium. The products of the reaction exert no other effect on the rate of inversion than would some other neutral substance, glycerine for example, which increased the viscosity of the liquid in a similar fashion.—V. H. Young.

1339. FLOHIL, J. T. Volumetric method for the determination of diastatic capacity. *Jour. Indust. Eng. Chem.* 12: 677. 1920.

1340. GORE, H. C. Occurrence of diastase in the sweet potato in relation to the preparation of sweet potato syrup. *Jour. Biol. Chem.* 44: 19-20. 1920.—Sweet potatoes are high in diastatic power, and it is possible to convert nearly all of their starch into soluble carbohydrates by slowly cooking the potatoes in water.—G. B. Rigg.

1341. KOPELOFF, N. Effect of varying the amount of inoculum and concentration on the deterioration of sugar by molds. *Jour. Indust. Eng. Chem.* 12: 455-457. 1920.—An increase in the number of mold spores inoculated into sugars (with films of varying concentration) is responsible for an increase in deterioration. The amount of deterioration also increases with a decrease in concentration of the films surrounding the sugar crystals.—Henry Schmitz.

1342. KOPELOFF, N., LILLIAN KOPELOFF, AND C. J. WELCOME. **Formation of the gum, levan, by mold spores.** I. Identification and quantitative determination. II. Mode of formation and influence of reaction. Jour. Biol. Chem. 43: 171-187. 1920.—Mold spores (*Aspergillus Sydowi* Bainier) contain an enzyme (levanase) capable of forming the gum, levan, in sucrose solution of all concentrations up to the saturation point.—*G. B. Rigg.*

1343. KOPELOFF, N., AND H. Z. E. PERKINS. **The deterioration of Cuban raw sugars in storage.** Jour. Indust. Eng. Chem. 12: 555-558. 1920.—When Cuban raw sugar is held 5.5 months under storage conditions there is a loss in polarization. The loss in polarization in each instance has generally been accompanied by a gain in reducing sugars, indicating that the loss is a true inversion due to microbiological agencies.—*Henry Schmitz.*

1344. NEUBERG, C., AND ELSA REINFURTH. **Über den Chemismus der alkoholischen Gärung, zugleich Bemerkungen zur gleichnamigen Mitteilung von E. Zerner.** [The chemistry of alcoholic fermentation.] Ber. Deutsch. Chem. Ges. 53: 462-469. 1920.—A critical discussion of ZERNER's work. The authors, working along the same line as ZERNER, obtained similar results, but deduced different conclusions.—*Henry Schmitz.*

1345. NEUBERG, C., AND ELSA REINFURTH. **Über die Vergärbarkeit der Brenztraubensäure unter den Bedingungen des Abfangverfahrens.** [Concerning the fermentability of pyruvic acid with the removal of intermediate products.] Ber. Deutsch. Chem. Ges. 53: 1039-1052. 1920.—The author demonstrates by eleven different methods that pyruvic acid may be fermented by yeasts in the presence of sodium bisulphite, and interprets this fact as evidence in support of the acetaldehyde-pyruvic acid theory of fermentation.—*Henry Schmitz.*

1346. PETERSON, W. H., AND E. B. FRED. **The production of acetaldehyde by certain pentose-fermenting bacteria.** Jour. Biol. Chem. 44: 29-46. 1920.—In the presence of a fixative, such as calcium sulphite, acetaldehyde is formed in the fermentation of carbohydrates by *Bacillus acetoethylicum*, *Lactobacillus pentoaceticus* and also by an undetermined organism. Aldehyde is produced from glucose and starch but the maximum yield is obtained from xylose. The production of acetaldehyde is correlated with the production of alcohol, an increase in the former results in a decrease in the latter.—*G. B. Rigg.*

1347. RAISTRICK, HAROLD. **Studies on the cycloclastic power of bacteria. Part I. A quantitative study of the aerobic decomposition of histidine by bacteria.** Biochem. Jour. 13: 447-458. Fig. 7. 1919.—*Bacillus paratyphosus A*, *B. paratyphosus B*, *B. faecalis alcaligenes*, and *B. pyocyaneus* are able to break the iminazole ring since they produce ammonia both from the side chain and from the iminazole nucleus of the histidine molecule. *B. proteus vulgaris* produces ammonia from the side chain nitrogen only.—*Alva R. Davis.*

1348. RECTOR, THOS. M. **Lipolytic enzymes in olive oil.** Jour. Indust. Eng. Chem. 12: 156-158. 1920.—A fat-hydrolyzing enzyme, which is totally destroyed by heating the oil at 150°C. for 15 minutes, and which retains its activity for a number of years, is contained in untreated, filtered olive oil.—*Henry Schmitz.*

1349. SCHOORL, N. **Die Volumenänderung bei der Saccharose-Inversion.** [Volume changes with saccharose inversion.] Zeitschr. Untersch. Nahrungs- u. Genussmittel 39: 113-121. 1920.

1350. SPEAKMAN, H. B. **Gas production during the acetone and butyl alcohol fermentation of starch.** Jour. Biol. Chem. 43: 401-411. 1920.

1351. ZERNER, E. **Über den Chemismus der alkoholischen Gärung.** [The chemistry of alcoholic fermentation.] Ber. Deutsch. Chem. Ges. 53: 325-334. 1920.—Evidence is presented to show that when sodium sulphate is added to fermentation cultures glycerine and acetaldehyde are intermediate products and occur along with alcohol. Under normal conditions (without sodium sulphite) these two first-named products are not formed.—*Henry Schmitz.*

METABOLISM (RESPIRATION)

1352. BAILEY, C. H., AND A. M. GURJAR. Respiration of cereal plants and grains. II. Respiration of sprouted wheat. Jour. Biol. Chem. 44: 5-7. 1 fig. 1920.—Respiration proceeds at a higher rate in the sprouted wheat than in normal wheat. At 12.5 to 14 per cent water content the ratios of the respiratory rate in (1) normal wheat, (2) wheat germinated 24 hours, (3) wheat germinated 48 hours was not far from the ratios of their reducing sugar content.—*G. B. Rigg.*

1353. BAILEY, C. H., AND A. M. GURJAR. Respiration of cereal plants and grains. III. Respiration of rice paddy and milled rice. Jour. Biol. Chem. 44: 9-12. Fig. 1. 1920.—The germ, or the embryo, is the seat of the most active respiration in a typical grain.—*G. B. Rigg.*

1354. BAILEY, C. H., AND A. M. GURJAR. Respiration of cereal plants and grains. IV. The respiration of frosted wheat plants. Jour. Biol. Chem. 44: 13-15. 1920.—Frozen plants respired more vigorously during the first 24 hours after thawing than did plants that had not been frozen.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1355. BUDER, JOHANNES. Aus der Biologie der Purpurbakterien. [The biology of the purple bacteria.] Naturwissenschaften 8: 261-268. 2 fig. 1920.—This paper brings together some of the latest results which contribute to the biology of this unique group. It discusses, first, the different members of the group and their classification according to their sulphur content and pigmentation. Absorption curves of bacteriopurpurin as well as one of the living bacteria themselves are reproduced, together with a figure showing the characteristic gathering of the bacteria in different regions of the spectrum. This last shows an unusual response of the bacteria to ultra red rays, the physiological and ecological significance of which is discussed. The phototactic movements of the purple bacteria are also considered.—*Orton L. Clark.*

1356. GALIPPE, V. Des micro-organismes vivant dans le papier; leur résistance à l'action de la chaleur et à celle du temps. [The micro-organisms of paper; their resistance to the action of heat and weather.] Compt. Rend. Acad. Sci. Paris 169: 814-817. 1919.—Examination of ancient papers and papyrus demonstrated the presence of large numbers of micro-organisms which were secured in pure cultures. The author concludes from his studies that many bacteria are extremely resistant to the action of various unfavorable factors of their environment and are capable of existing for long periods of time.—*V. H. Young.*

1357. JOFFE, JACOB S. The influence of soil reaction on the growth of alfalfa. Soil Sci. 10: 301-307. 1 fig. 1920.—See Bot. Absts. 7, Entry 1398.

1358. WHITING, A. L., AND ROY HANSEN. Cross-inoculation studies with the nodule bacteria of lima beans, navy beans, cowpeas, and others of the cowpea group. Soil Sci. 10: 291-300. 1920.—See Bot. Absts. 7, Entry 1406.

GROWTH, DEVELOPMENT, REPRODUCTION

1359. BLACKMAN, V. H. The significance of the efficiency index of plant growth. New Phytol. 19: 97-100. 1920.—This is an answer to the paper by KIDD, WEST, and BRIGGS. It is pointed out that "the efficiency index does nevertheless give a measure of the plant's average efficiency during any particular period."—*I. F. Lewis.*

1360. BOSE, J. C. Researches on growth of plants. Nature 105: 615-617. 3 fig. 1920.—Brief descriptions of methods, figures of the high magnification crescograph and of some records.—*O. A. Stevens.*

1361. KIDD, FRANKLIN, CYRIL WEST, AND G. E. BRIGGS. **What is the significance of the efficiency index of plant growth?** *New Phytol.* 19: 88-96. 2 fig. 1920.—This is a critique of the compound interest conception of plant growth advocated by V. H. BLACKMAN and applied by BRENCHLEY in the comparison of the efficiency of different plants.—*I. F. Lewis.*

1362. HEINICKE, ARTHUR J. **Concerning the shedding of flowers and fruits and other abscission phenomena in apples and pears.** *Proc. Amer. Soc. Hort. Sci.* 16: 76-83. 1920.—See Bot. Absts. 7, Entry 977.

1363. MITSCHERLICH, E. A. **Zum Gesetze des Pflanzenwachstums.** [Regarding the law of plant growth.] *Fühlings Landw. Zeitg.* 68: 419-426. 1919.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1364. GUTTENBERG, HERMANN VON. **Der heutige Stand der Statolithentheorie des Geotropismus.** [The present status of the statolith theory of geotropism.] *Naturwissenschaften* 8: 571-577. 3 fig. 1920.—A review is given of the recent work of ZOLLIKOFER, BUDER, RICHTER, and others which add evidence in support of HABERLANDT's and NEMEC's theory which has called forth so much discussion and experimental work. The arguments of the opponents of this theory (FITTING, JOST, ZIELINSKI, F. & G. WEBER, and HEILBRONN) are taken up in detail.—*Orton L. Clark.*

1365. PÜTTER, A. **Das Gesetz der Reizschwelle.** [The law of the threshold of stimulation.] *Naturwissenschaften* 8: 501-507. 1920.—This paper attempts to show in how far it has been possible to go into a physico-chemical analysis of the threshold of stimulation. This is given in detail for electrical and light stimuli, with a consideration of the formulae of NERNST and HILL for the first, and PÜTTER's own formula for the latter. The difference in the effect of electrical and light stimuli is also pointed out. Light, gravity, and electrical stimuli are grouped as those which may instantly affect the plant at full strength, whereas chemical osmotic, and heat stimuli are effective only after the diffusion of the agents, and a certain time factor is requisite. It is not possible to express in any one formula a general law for the threshold of stimulation, but different equations are required, and these vary with the type of stimuli. In summarizing PÜTTER feels that the necessary conditions of the threshold of stimulation may be expressed as "a sensitiveness in a living system when in the system, or at a certain point in it, the concentration of certain active substances reach, in a definite time, a certain magnitude, which is constant for the different systems and different stimuli."—*Orton L. Clark.*

1366. SMALL, JAMES. **A theory of geotropism: with some experiments on the chemical reversal of geotropic response in stem and root.** *New Phytol.* 19: 49-63. 1 pl., 5 fig. 1920.—A statement is made of certain hypotheses previously advanced to explain the difference in electrical condition of the upper and under side of a horizontally placed root, and of geotropic response in general. Curvature is explained on the basis of five postulations. (1) The protoplasm of the root is characterized by a condition of comparative acidity on the basis of the H-ion concentration as compared with the iso-electric point of the amphoteric colloids present. (2) The protein, or protein-lipoid, disperse phase in the root becomes therefore electropositive. (3) There is greater polarization on the upper side of any cell and therefore a higher potential in the upper region of the root. (4) An action current flows, therefore, from the upper to the lower side of the perceptive region; on account of the resistance, its maximum effect is produced on the under side of the root. (5) The polarization of the lower cells is thus lowered, their permeability is increased, and the familiar bending phenomena are brought about.—Geotropic response of stems is explained on the same basis, the protoplasm however being electronegative and the flow of the action current being in the reverse direction from that in the root.—Experiments are cited to render greater probability to the theory. Roots of *Vicia Faba* and maize when grown in an atmosphere containing a low concentration of ammonia showed reversal of the usual geotropic response. Conversely, stems became positively

geotropic when grown in an atmosphere containing acetic acid.—From the experiments it is concluded that the stem may be considered “of an ‘alkaline’ nature with electronegative particles in the disperse phase of the plasma membrane and that the root is of an ‘acid’ nature with electropositive particles.”—Theoretical explanations are also given of the orientation of secondary and tertiary roots and stems.—*I. F. Lewis.*

GERMINATION, RENEWAL OF ACTIVITY

1367. KIDD, FRANKLIN, AND CYRIL WEST. The rôle of the seed-coat in relation to the germination of immature seed. *Ann. Bot.* 34: 439-445. 1920.—The germination of unripe mustard seeds and peas from which the seed-coats had been removed was compared with that of intact unripe seeds and with that of ripe seeds. It was found that the removal of the testa accelerated germination, terminated the dormant period and increased the percentage of germination. It is concluded that the presence of the testa is largely responsible for the dormant period when attempts are made to germinate unripe seeds, and evidence is presented to show that the effect is due to the living testa limiting the gaseous exchange of the embryo.—*W. P. Thompson.*

1368. HILL, A. W. Studies in seed germination. Experiments with *Cyclamen*. *Ann. Bot.* 34: 417-429. *Pl.* 20, 15 fig. 1920.

TEMPERATURE RELATIONS

1369. KIESSELBACH, T. A., AND J. A. RATCLIFF. Freezing injury of seed corn. *Nebraska Agric. Exp. Sta. Res. Bull.* 16. 96 p., 22 fig. 1920.—See *Bot. Absts.* 7, Entry 623.

1370. MANARESI, ANGELO. Sui danni prodotti ai fiori degli alberi fruttiferi dalle gelate primaverili in genere e da quelle in particolare dei giorni 28, 29 e 30 marzo 1918. [Damage to flowers of fruit trees by spring frosts and in particular the frosts of the 28, 29 and 30 of March, 1918.] *Rev. Patol. Veg.* 10: 1-26. 1919.—See *Bot. Absts.* 7, Entry 986.

RADIANT ENERGY RELATIONS

1371. FEUER, B., AND F. W. TANNER. The action of ultraviolet light on the yeast-like fungi. I. *Jour. Indust. Eng. Chem.* 12: 740-741. 1920.—The data obtained indicate that yeast cells are not very resistant to ultraviolet light. A majority of the organisms studied were killed after an exposure to the rays of less than one minute.—*Henry Schmitz.*

1372. KÖGEL, P. R. Über Photodynamie. [Photodynamics.] *Zentralbl. Gesamte Landw.* 1: 288-292. 1920.—Review of recent work, with bibliographical citations.—*D. Reddick.*

1373. LAURENS, H., AND H. D. HOOKER, JR. The sensibility of *Volvox* to wave-lengths of equal energy content. *Jour. Exp. Zool.* 30: 345-368. 1920.—The stimulation-time and the rate of locomotion were ascertained in different regions of the spectrum all equal in energy. The maximum effect in both was found to be near wave-length 494 μ . From this region the effect decreased rapidly in both directions. These results agree closely with those obtained by Mast on *Chlamydomonas* and blow-fly larvae; but they are at considerable variance with those obtained on the more nearly related forms, *Pandorina*, *Eudorina* and *Spondylomorom*.—*S. O. Mast.*

TOXIC AGENTS

1374. GREIG-SMITH, R. The germicidal activity of the Eucalyptus oils. Part 2. The action of the oils in aqueous dilutions. *Proc. Linn. Soc. New South Wales* 44: 311-347. 7 fig. 1919.—See *Bot. Absts.* 7, Entry 1282.

1375. MONTEMARTINI, LUIGI. Nuove osservazioni sopra l'azione eccitante del sulfato di rame sulle piante. [The stimulating action of copper sulfate on plants.] Rev. Patol. Veg. 10: 36-40. 1920.—Tests were made by spraying one side of a plant and leaving the other unsprayed. When half of the leaves were treated in the morning with a dilute copper sulphate solution and removed in the evening, measured, and the dry weight determined, it was found that the treated leaves had a greater dry weight per unit area. When the leaves were treated at night and removed in the morning, they had a lower dry weight per unit area. This indicates that the treatment stimulated the formation and translocation of organic matter.—*F. M. Blodgett.*

1376. NEMEC, ANTOINE, AND FRANCOIS STRANAK. Contribution à l'étude de l'influence toxique des terpenes a l'égard de quelques végétaux supérieurs. [The toxic action of terpenes on higher plants.] Rev. Gén. Bot. 32: 241-246. 1920.—Seedlings of *Vicia Faba*, *Zea Mays*, and *Lupinus Luteus* were grown on Knop's solution in cylinders of twenty liters capacity. The terpenes used were menthol, terpineol, pinene and borneol.—When etiolated seedlings of *Vicia Faba* were exposed to the action of the terpenes, black spots appeared on the surface of the leaves which later became more prominent. Then the stem turned gray and finally black. A "mucous" appears on the stem which has an acid reaction. The plant finally loses turgor and wilts. The ramification of the roots are checked.—Internally the blackening is localized in different regions, as in the cambium. In the root the effect of the vapors occurs first in the recently formed positions of the vascular tissue, and later the remainder is affected. Finally the root forms a tissue (calyphogène) which acts as a protecting layer against the vapors of the terpenes.—The plants experimented with show different degrees of resistance to the vapors of the terpenes.—*J. M. Brannon.*

1377. PERRY, MARGARET C., AND G. D. BEAL. The quantities of preservatives necessary to inhibit and prevent alcoholic fermentation and the growth of molds. Jour. Indust. Eng. Chem. 12: 253-257. 1920.—*Aspergillus Sydowi*, *Aspergillus niger*, and *Penicillium expansum* in the order named, effected the greatest deterioration in both molasses and sugar. There is also evidence that an increase in inoculum is responsible for an increase in inversion at a definite concentration.—*Henry Schmitz.*

1378. RUSK, HESTER M. The effect of zinc sulphate on protoplasmic streaming. Bull. Torrey Bot. Club 47: 425-431. 2 fig. 1920.—Since metallic poisons in minimal doses stimulate metabolic activity in plants, it was thought that ocular evidence of excitation might be observed in individual cells. Zinc sulphate was used and its effect on rate of streaming was noted in *Elodea* and in *Chara*. Acceleration was evident in both plants, *Elodea* being more sensitive than *Chara*, but with a less maximum acceleration.—*P. A. Munz.*

PHYSIOLOGY OF DISEASE

1379. HARVEY, R. B. Hydrogen-ion changes in the mosaic disease of tobacco plants and their relation to catalase. Jour. Biol. Chem. 42: 397-400. 1920.—The H-ion concentration of juice expressed from mosaic tobacco leaves was found to be somewhat greater than that from healthy plants. Catalase activity in the mosaic leaves is decreased with increasing hydrogen-ion concentration.—*G. B. Rigg.*

MISCELLANEOUS

1380. BRADFORD, SAMUEL CLEMENT. On the theory of gels. II. The crystallization of gelatin. Biochem. Jour. 14: 91-93. 1920.

1381. KROGH, AUGUST. The calibration, accuracy and use of gas meters. Biochem. Jour. 14: 282-289. 2 fig. 1920.—This article refers to gas meters employed in physiological research.—*A. R. Davis.*

1382. KROGH, AUGUST. A gas analysis apparatus accurate to 0.001 per cent, mainly designed for respiratory exchange work. *Biochem. Jour.* 14: 267-281. 4 fig. 1920.

1383. MARTIN, CHARLES JAMES. The preparation of Sørensen's phosphate solutions when the pure salts are not available. *Biochem. Jour.* 14: 98. 1920.

1384. MUTSCHELLER, ARTHUR. Colloidal adsorption. *Jour. Amer. Chem. Soc.* 42: 2142-2160. 1920.

1385. SCHMIT-JENSEN, HANS OLUF. Estimation of carbon dioxide, oxygen and combustible gases by Krogh's method of micro-analysis. *Biochem. Jour.* 14: 4-24. 2 fig. 1920.—A detailed description is given of KROGH's method as modified by the author. Special emphasis is placed upon the value of the method in biological work.—*Alva R. Davis.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

GENERAL

1386. ALWAY, F. J. Agricultural value and reclamation of peat soils. *Minnesota Agric. Exp. Sta. Bull.* 188: 1-136. 54 fig. Mar., 1920.—The peat soils of the state are divided into groups of high and low lime content. On the high lime peats, applications of lime are of no advantage and sufficient nitrogen becomes available as farm and garden crops need this element. The high lime peats are classed according to their need for chemical fertilizers. Low lime peats need both lime and nitrogen applications. Ascertaining the fertilizer requirements of individual tracts is always advisable. Drainage, water level control, and heavy rolling are necessary. Burning is advised only after careful consideration of the local conditions.—Extensive drainage of peat soils before reclamation operations are to be started is inadvisable. The advisability of entering on reclamation work with peat depends upon location and facilities for operation.—*A. C. Arny.*

1387. BEAR, FIRMAN E. Chemical analysis of soils. *Ohio Agric. Exp. Sta. Monthly Bull.* 5*: 227-232. 1920.—Chemical analyses of soils are valuable as a guide to the planning of permanent systems of soil improvement, as an index to the direction in which the supply of plant food is moving, as a basis for interpretation of experimental data from different soils, as a guide to the application of results obtained on experimental farms and gives definite information as to the potential fertility of a soil.—*R. C. Thomas.*

1388. [C., C.] Soils and manures. [Rev. of: WILD, L. J. *Soils and manures in New Zealand.* 134 p. Whitecombe and Tombs: Auckland, Melbourne and London, 1919. Also of: RUSSELL, E. J. *A students' book on soils and manures.* 2nd ed., XII + 240 p. University Press: Cambridge, 1919]. *Nature* 105: 130-131. 1920.

1389. CLARKE, FRANK WIGGLESWORTH. The data of geochemistry. *U. S. Geol. Surv. Bull.* 695. 832 p. 4th edition. 1920.—The chemical constituents of the earth's crust are given together with certain general conclusions.—*C. V. Piper.*

1390. COLLINSON, R. C. A progress report of fertilizer experiments with fruits. *New York Agric. Exp. Sta. [Geneva] Bull.* 477. 53 p. 1920.

1391. FINDLAY, HUGH. The handbook for practical farmers. 558 p., 258 fig. D. Appleton & Company: New York and London, 1920. See *Bot. Absts.* 7, Entry 609.

1392. FORTIER, S. Relation to orchard irrigation practice. *Monthly Bull. California State Commission Hort.* 7: 361-367. 1919.—Arid soils in general and orchard soils in particu-

lar need abundant water and organic matter. The part played by capillarity in the upward moving of water has been overestimated. It is held that gravity acts upon capillary as well as free water. The writer concludes in pointing out the relative advantages and disadvantages of the basin method and furrow method of irrigation of fruit trees.—*E. L. Overholser.*

1393. HEADLEY, F. B. **Unreliable experimental methods of determining the toxicity of alkali salts.** *Science* 51: 140-141. Feb., 1920.—The method frequently used by investigators of adding certain percentages of salts to soils, planting them to crops, and estimating the toxicity by depression of crop growth, has led to erroneous conclusions. It has been shown that soils absorb a part at least of salts added, and that the crop growth is much more closely related to the proportion of alkali salts recoverable from the soils than to the proportion of salts that have been added. The conclusions in two papers on the subject, published by Harris, and Harris and Pittman, respectively, are criticized as unjustified, on account of the fact that the salts recoverable by analysis after the treatments were made were not taken into consideration.—*A. H. Chivers.*

1394. MOCKERIDGE, FLORENCE ANNIE. **The occurrence and nature of the plant growth promoting substances in various organic manurial composts.** *Biochem. Jour.* 14: 432-450. 1920.—See Bot. Absts. 7, Entry 1318.

1395. R., E. J. **A standard book on soils.** [Rev. of: HALL, A. D. *The soil: an introduction to the scientific study of the growth of crops.* 3d ed. XV + 352 p. John Murray: London, 1920.] *Nature* 105: 384, 1920.—“Its distinguishing feature is its clear recognition of the complexity of the soil problem.”—*O. A. Stevens.*

1396. STEAD, ARTHUR. **The agriculture and soils of the Cape Province. I. Witkop-Burgersdorp.** *Jour. Dept. Agric. Union of South Africa* 1: 429-441, 660-670. 1920.

1397. WILLIAMS, C. B. **Report of the Division of Agronomy.** *North Carolina Agric. Exp. Ann. Rep.* 42: 21-39. 1920.—See Bot. Absts. 7, Entry 677.

SOIL ACIDITY

1398. JOFFE, JACOB S. **The influence of soil reaction on the growth of alfalfa.** *Soil Sci.* 10: 301-307. *Fig. 1.* 1920.—Pot experiments with alfalfa were carried out in soil to which varying quantities of sulfuric acid or calcium carbonate were added. The hydrogen-ion exponent of the soil was determined by Gillespie's method at the beginning, during, and at the end of the experiment. The germination of alfalfa seed was practically the same in soils varying from Ph. 4.5-7.0 but was greatly reduced in soils below Ph. 4.5. The yields of tops showed a gradual increase with an increase of Ph. from 3.8-7.0. The nodule production and nitrogen content of the plants increased with decreasing hydrogen-ion concentration.—*W. J. Robbins.*

1399. KNIGHT, H. G. **Acidity and acidimetry of soils. I. Studies of the Hopkins and Pettit method for determining soil acidity.** *Jour. Indust. Eng. Chem.* 12: 340. 1920.—A detailed account of cation and anion absorption by soil is presented.—*Henry Schmitz.*

1400. KNIGHT, H. G. **Acidity and acidimetry of soils. II. Investigation of acid soils by means of the hydrogen electrode.** *Jour. Indust. Eng. Chem.* 12: 457-464. 1920.—A new hydrogen electrode has been designed which has proved satisfactory for certain types of soil investigation. Various reactions and effects of acid soils are discussed.—*Henry Schmitz.*

1401. KNIGHT, H. G. **Acidity, and acidimetry of soils. III.—Comparison of methods for determining lime requirements of soils with hydrogen electrode. IV.—Proposed method for determination of lime requirements of soils.** *Jour. Indust. Eng. Chem.* 12: 559-562. 1920.—A method is proposed for determining the power of a soil to decompose calcium carbonate

which approximates the results obtained by use of the hydrogen electrode. The Hopkins and hydrogen electrode methods show the highest percentage consistency for measuring the reduction of acidity for limed soils.—*Henry Schmitz.*

INFLUENCE OF BIOLOGICAL AGENTS

1402. AMES, J. W. **Supply of nitrogen in the soil.** Ohio Agric. Exp. Sta. Monthly Bull. 6⁵⁴: 174-178. 3 tables.—Information concerning changes of the nitrogen supply of the soil occasioned by differences in treatment, under cultivation, with fertilizers, lime and manure, is gained by a comparison of the nitrogen content of fertility plots on the Wooster farm.—*R. C. Thomas.*

1403. ELLETT, W. B., AND W. G. HARRIS. **Coöperative experiments for the composting of phosphate rock and sulfur.** Soil Sci. 10: 315-325. 1920.—Using composts of soil and rock phosphate; soil, rock phosphate and sulfur; soil, rock phosphate, sulfur and manure, inoculated and uninoculated with sulfofying microorganisms, the water soluble, ammonium-citrate-soluble and total phosphoric acid as well as the sulfuric acid, total nitrogen, nitrate and ammonia were determined. The results show that the addition of manure to a compost of soil, sulfur and rock phosphate increases the availability of the rock phosphate. All Virginia soils have some sulfofying power. The composting of sulfur, soil, rock phosphate, and manure is not recommended for the use of farmers because of the slowness of the process and mechanical difficulties.—*W. J. Robbins.*

1404. LIPMAN, J. G., AND J. S. JOFFE. **The influence of initial reactions on the oxidation of sulfur and the formation of available phosphates.** Soil Sci. 10: 327-332. 2 fig. 1920.—Varying quantities of sulfuric acid were added to soil containing 15 per cent rock phosphate and 5 per cent sulfur. The hydrogen-ion exponent of the soils varied from Ph. 4.7-5.4. The soluble phosphates and hydrogen-ion concentrations were determined weekly. By the end of the 12th week the hydrogen-ion exponent had fallen to Ph. 1.4-2.0 but little further change occurred. The amount of soluble phosphate increased during the 20 weeks of the experiment reaching 83 to 85 per cent but no influence of the initial reaction on the formation of the soluble phosphates was noted.—*W. J. Robbins.*

1405. MAZÉ, P., VILA ET LEMOIGNE. **Transformation de la cyanamide en urée par les microbes du sol.** [Transformation of cyanamide into urea by micro-organisms of the soil.] Compt. Rend. Acad. Sci. Paris 169: 921-923. 1919.—See Bot. Absts. 7, Entry 1334.

1406. WHITING, A. L., AND ROY HANSEN. **Cross-inoculation studies with the nodule bacteria of lima beans, navy beans, cowpeas and others of the cowpea group.** Soil Sci. 10: 291-300. 1920.—Pot experiments with leguminous plants and pure cultures of *B. radiculicola* show that the nodule bacteria of the lima bean (*Phaseolus lunatus*) are distinct from those of the navy and kidney bean (*Phaseolus vulgaris*) but are identical with those of the cowpea. (*Vigna sinensis*).—*W. J. Robbins.*

1407. WRIGHT, R. C. **Nitrogen economy in the soil as influenced by various crops grown under control conditions.** Soil Sci. 10: 249-289. 9 fig. 1920.—Leguminous and non-leguminous crops were grown in containers holding about 100 lbs. of soil. Nitrogen in the plant and in the soil was determined. Under the conditions of the experiment the fallow soil showed a loss of nitrogen. Under some crops there was an absolute loss of nitrogen in excess of that recovered in the crop and this varied with the crop and soil. Legumes may show this loss as well as non-legumes. When nitrogen fixation takes place in the growth of legumes the removal of the crop above ground depletes the soil of nitrogen just as if a non-leguminous crop had been grown.—*W. J. Robbins.*

FERTILIZATION

1408. BURGESS, J. L. Part I. The relative availability of acid phosphate and the native soil phosphates in the presence of pulverized limestone. Part II. Future of the agricultural lime industry. Bull. North Carolina Dept. Agric. 41²: 5-24. 1920.—The first part is a compilation of opinions on the influence of lime in rendering potash available. The second part is an expression of opinion that lime is to be regarded as a fertilizer element.—*F. A. Wolf*.

1409. HIBBARD, R. P., AND S. GERSHBERG. The biological method of determining the fertilizer requirement of a particular soil or crop. Michigan Acad. Sci. Ann. Rept. 21: 223-224. 1919.—See Bot. Absts. 6, Entry 1419.

1410. JORDAN, W. H. Soil studies: I. The influence of fertilizers upon the productiveness of several types of soil. II. The influence of fertilizers and plant growth upon soil solubles. New York Agric. Exp. Sta. [Geneva] Bull. 473. 27 p. 1920.—Part I deals with a series of forcing-house experiments in which peat, stable manure, and commercial fertilizers, in varying proportions, were applied to several kinds of soil in which barley was grown. Perhaps the most interesting feature of these experiments was the fact that a sandy soil of an inferior type for general cropping produced twice as much dry substance in boxes to which no fertilizer was applied as did a clay loam soil notably fertile in field culture. In Part II an account is given of experiments in which it was shown that the application of soluble compounds of nitrogen, phosphorus, and potassium to various kinds of soil increased the proportion of water soluble in the soil. It was also shown that a growing crop (barley) utilizes the soluble material and rapidly reduces the quantity of such material in the soil even while the plants are in an early stage of growth.—*F. C. Stewart*.

1411. MAZÉ, P., VILA AND LEMOIGNE. Action de la cyanamide et de la dicyanodiamide sur le développement du maïs. [Action of cyanamide and dicyanodiamide on the development of maize.] Compt. Rend. Acad. Sci. Paris 169: 804-807. 1 fig. 1919.—See Bot. Absts. 7, Entry 1333.

1412. PLUMMER, J. K., AND WOLF, F. A. Borax injury to crops. North Carolina Dept. Agric. Bull. 41¹⁵: 1-20. Fig. 8. 1920.—Field observations made in 1919 indicated that considerable damage to crops in North Carolina had resulted from the use of fertilizers containing borax. The injury manifested itself by death and stunting of plants so that the stands were not uniform, plants of the same age differed in size, and yields, in consequence, were greatly decreased.—The present investigation with corn and cotton on Cecil clay loam and cotton and tobacco on Durham sandy loam in pot cultures agrees with field observations in showing that plants are more susceptible to injury on the lighter soils.—In sandy soil, as little as one pound of anhydrous borax per acre injured tobacco and no cotton grew in any pots containing over five pounds per acre. In clay soil, both cotton and corn showed marked injury when the amounts of borax exceeded seven pounds of anhydrous borax per acre, but the plants survived in these series.—The tobacco plants which were poisoned in the third transplanting gradually recovered and after two months were apparently normal, thus presenting a condition similar to that found in the field.—The corn plants on sandy soil, to which borax at the rate of 5 pounds per acre was applied, showed considerable injury whereas, with an application of 10 pounds per acre, they were entirely lacking in green color and soon died.—Interference with color formation by boron does not appear to be related to the assimilation of iron nor to plastid formation.—There is no reason to believe borax will remain in the soil and cause damage to crops succeeding those which have been injured by borax. Borax disappears from the zone occupied by roots by leaching.—*F. A. Wolf*.

1413. SCHREINER, OSWALD, B. E. BROWN, J. J. SKINNER, AND M. SHAPOVALOV. Crop injury by borax in fertilizer. U. S. Dept. Agric. Circ. 84: 3-35. 25 fig. 1920.—See Bot. Absts. 6, Entry 1431.

FERTILIZER RESOURCES

1414. ANONYMOUS. **The nitrogen problem; by-products.** [Rev. of: ANONYMOUS. Ministry of munitions of war. Munitions inventions department. Nitrogen products committee. Final report. VI + 357 p. H. M. Stationery office: London, 1919.] Nature 105: 201-202. 1920.—See also Bot. Absts. 7, Entry 1417.

1415. ANONYMOUS. **The manufacture of synthetic ammonia and production of nitrates.** Nature 105: 312. 1920.—Note on beginning of work by the government. See also Bot. Absts. 7, Entry 1417. (The Nitrogen problem. Nature 104: 533.)—*O. A. Stevens.*

1416. ANONYMOUS. **Basic slag and its use in agriculture.** Nature 105: 183-184. 1920.—A discussion organized by the Faraday Society, held Mar. 23. Slag produced by Bessemer process has a marked effect on pastures, and British agriculturists could use 300,000 to 400,000 tons a year. The open hearth process which is likely to supersede the Bessemer yields two slags, both poorer in phosphates.—*O. A. Stevens.*

1417. ANONYMOUS. **The nitrogen problem.** [Rev. of: ANONYMOUS. Ministry of munitions of war. Munitions inventions department. Nitrogen products committee. Final report. VI + 357 p. H. M. Stationery office: London, 1919.] Nature 104: 533-535, 568-570. 1920.—Committee estimates post-war supply of fixed nitrogen potentially available is likely to show an increase of 30 to 40 per cent upon pre-war production, almost wholly due to development of synthetic processes. Demands of war set aside needs of agriculture to the great detriment of the world's food supply, causing almost universal recognition of the vital importance of nitrogenous fertilizers. Under favorable conditions nitrogen fixation and allied processes stand at a very considerable advantage as compared with non-synthetic methods (based on pre-war prices). The committee recommends the establishment of: (1) calcium cyanamide process to yield 60,000 tons per annum, (2) synthetic ammonia (HABER) process up to minimum of 10,000 tons of ammonia per annum, and (3) ammonia oxidation plant, in conjunction with the synthetic ammonia factory, to yield 10,000 tons of 95 per cent nitric acid or its equivalent in nitrates. The investigation of other fixation processes is recommended.—*O. A. Stevens.*

1418. JENKINS, E. H., AND E. MONROE BAILEY. **Fertilizer report for 1919.** Connecticut (New Haven) Agric. Exp. Sta. Bull. 217: 53-106. 1919.—Analyses of 339 brands of fertilizers offered for sale in the state are given.—*Henry Dorsey.*

1419. RUSSELL, E. J. **The manufacture of artificial fertilizers.** [Rev. of: LLOYD, STRAUSS L. Mining and manufacture of fertilizing material and their relation to soils. VI + 153 p. D. Van Nostrand Co.: New York. Crosby, Lockwood and Son, London. 1919.] Nature 105: 4-5. 1920.—Reviewer considers the two chapters on pebble phosphate and hard-rock phosphate fairly good. Other chapters contain much that is poorly selected or antiquated.—*O. A. Stevens.*

1420. THORNE, CHAS. E. **Basic slag vs. acid phosphate.** Ohio Agric. Exp. Sta. Monthly Bull. 55: 141-147. 1920.—A comparison of the two materials as a source of phosphorus. Basic slag was found to be a useful carrier of phosphorus, but the claim made that it is superior to acid phosphate is not justified.—*R. C. Thomas.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

SPERMATOPHYTES

1421. ANONYMOUS. **Diagnoses Africanæ. LXXIII.** Bull. Misc. Inf. Kew 1920: 23-29. 1920.—The following new species and varieties are described and new combinations made: *Acmadenia teretifolia* Phillips (*Diosma teretifolia* Link), *A. teretifolia* var. *glabrata* Phillips (*Diosma teretifolia* var. *glabrata* Sond.), *Craterispermum caudatum* Hutchinson, *Senecio Snowdenii* Hutchinson, *Mostuea amabilis* Turrill, *Thunbergia prostrata* Turrill, *Asystasia amoena* Turrill, *Leucadendron uniflorum* Phillips, *Phyllanthus asperulatus* Hutchinson, *P. delagoensis* Hutchinson, and *Isachne angusta* Stapf.—*E. Mead Wilcox.*

1422. ANONYMOUS. **Decades Kewenses. Decas XCV.** Bull. Misc. Inf. Kew 1920: 66-71. 1920.—The following new species are described: *Stellaria Wallichiana* Haines, *Aspidopterys Hutchinsonii* Haines, *Tetrastigma alaicorne* Haines, *Knoria linearis* Gamble, *Oldenlandia anamalayana* Gamble, *O. Barberi* Gamble, *Jasminium Parkeri* Dunn, *Pseuderanthemum Daweii* Turrill, *P. ellipticum* Turrill, and *Lasiococca Comberi* Haines.—*E. Mead Wilcox.*

1423. B., E. G. [REV. OF: JÖRGENSEN, E. **Die Euphrasia-Arten Norwegens. (Euphrasia species in Norway.)** Bergens Museums Aarbok 1916-17; Naturvidenskabelig række nr. 5. 337 p., 11 maps, 14 pl., 54 fig. John Griegs: Bergen, 1919.] Jour. Botany 58: 111-112. 1920.—The various sections of the genus are characterized, and an abbreviated form of the key is reproduced. The monograph is in German with some notes in English.—*K. M. Wiegand.*

1424. BAKER, EDMUND G., AND C. E. SALMON. **Some segregates of *Erodium cicutarium* L'Herit.** Jour. Botany 58: 121-127. Pl. 554. 1920.—Segregates of *E. cicutarium* fall into two groups—those confined to sand dunes or similar places along the coast, and those growing normally inland. Only the coastal species are treated in this paper. A review of literature is given, followed by a key to the British species. Synonymy, careful descriptions, references to exsiccatae, and detailed notes on distribution are given for the five species treated. The following species are considered. *E. glutinosum* Dumort., *E. dentatum* Dumort., *E. neglectum* sp. nov., *E. Lebellii* Jord., and *E. Ballii* Jord. The plate contains illustrations of *E. neglectum* and *E. Lebellii*.—*K. M. Wiegand.*

1425. BENOIST, RAYMOND. **Liste de plantes récoltées en Guyane française par M. Wachenheim.** [List of plants collected in French Guiana by M. Wachenheim.] Bull. Mus. Hist. Nat. [Paris] 26: 85-92. 1920.—Besides many species previously known the following are described from this collection as new to science: *Ormosia cinerea* and *Melanoxyylon speciosum*.—*E. B. Payson.*

1426. BLAKE, S. F. **Revision of the true mahoganies (*Swietenia*).** Jour. Washington [D. C.] Acad. Sci. 10: 286-297. 2 pl., 2 fig. 1920.—The taxonomic history of the genus *Swietenia*, dating from the publication in 1743 of CATESBY'S "Natural History of Carolina," is cited, and the five known species are described, one of these being added as a new species. The most important of these commercially at the present time is probably *S. macrophylla*; this species has largely replaced in commerce *S. Mahogani*, which was much valued earlier. But much of the "mahogany" now on the market is from other genera than *Swietenia*, often, indeed, from widely separated families. Five species are recognized one of which, *S. cirrhata*, is new to science.—*Helen M. Gilkey.*

1427. BRITTON, N. L. **Two new West Indian plants.** Torreyia 20: 83-84. 1920.—Two new species are described: *Stenophyllus Harrisii* from Jamaica and *Croton Fishlockii* from the Virgin Islands.—*J. C. Nelson.*

1428. BRITTON, N. L. **The wild pimento of Jamaica.** Jour. New York Bot. Gard. 21: 38, 39. 1920.—*Amomis jamaicensis* Britton & Harris, sp. nov.—H. A. Gleason.

1429. BRITTON, N. L., AND C. F. MILLSAUGH. **The Bahama Flora.** Roy. 8 vo., viii + 695 p. Published by the authors: New York, June 26, 1920.—The present work includes plants of the four great phyla of the vegetable kingdom, namely, *Thallophyta*, *Bryophyta*, *Pteridophyta*, and *Spermatophyta*. The treatment of the lower groups has been contributed by prominent specialists, as follows: *Musci* by MRS. N. L. BRITTON; *Hepaticae* by PROFESSOR ALEXANDER W. EVANS; *Lichens* by PROFESSOR LINCOLN W. RIDDLE; *Algae* by DR. MARSHALL A. HOWE and MR. FRANK S. COLLINS; *Diatoms* by MR. CHARLES S. BOYER; *Fungi* by DR. FRED J. SEAVER and DR. WILLIAM A. MURRILL. Ample keys are provided for both genera and species, which, except in some of the lower groups, are described in detail and accompanied by a limited bibliography and synonymy. A chapter on "Exploration and Collections" is given; also a special chapter on "Bibliography," prepared with the cooperation of MR. JOHN H. BARNHART, is added. The following is a list of the new genera, species, combinations, etc., of which BRITTON & MILLSAUGH are the authors unless otherwise indicated; *Dichromena inaguensis* Britton, *Atamosco cardinalis* Britton (*Zephyranthes cardinalis* C. H. Wright), *Encyclia fucata* (*Epidendrum fucatum* Lindl.), *E. bahamensis* (*Epidendrum bahamense* Griseb.), *E. rufa* (*Epidendrum rufum* Lindl.), *E. diurna* (*Limodorum diurnum* Jacq.), *E. inaguensis* Nash, *E. plicata* (*Epidendrum plicatum* Lindl.), *E. acicularis* (*Epidendrum aciculare* Batem.), *Nidëma* gen. nov., *N. Ottonis* (*Epidendrum Ottonis* Rehb. f.), *Oncidium bahamense* Nash, *O. lucayanum* Nash, *Peperomia spathulifolia* Small, *Dendropemon brevipes* Britton, *D. bahamensis* Britton, *Coccolobis Northropiae* Britton, *Ocotea coraicea* Britton (*Laurus coriacea* Sw.), *Anneslia formosa* (*Acacia formosa* Kunth), *Cracca cathartica* (*Galega cathartica* Moc. & Sesse), *Dolichos insularis* Britton, *Erythroxylon confusum* Britton (*E. affine* A. Rich., not St. Hil.), *Polygala Wilsoni* Small, *Margaritaria bahamensis* (*Phyllanthus bahamensis* Urban), *Croton rosmarinoides* Millsp. (*C. rosmarinifolius* Griseb., not Salisb.), *Curcas Curcas* (*Jatropha Curcas* L.), *Adenorima gymnonota* Millsp. (*Euphorbia gymnonota* Urban), *Abutilon trisulcatum* (*Sida trisulcata* Jacq.), *Malache bahamensis* (*Pavonia bahamensis* Hitchc.), *Zuelania Guidonia* (*Laetia Guidonia* Sw.), *Anamomis lucayana* Britton, *Nymphoides aureum* Britton (*Limnanthemum aureum* Britton), *Neobracea bahamensis* Britton (*Braceia bahamensis* Britton), *Jacquemontia cayensis* Britton, *Gerardia bracteosa*, *Guettarda Nashii*, *G. Taylora*, *G. inaguensis*, *Borreria inaguensis* Britton, *B. saxicola* Britton, *V. Wilsonii* Britton, *B. bahamensis* Britton, *B. savannarum* Britton, *Lobelia lucayana*, *Eupatorium lucayanum* Britton, *Eschenbachia lyrata* (*Conyza lyrata* HBK.), *Neothymopsis* gen. nov., *N. thymoides* (*Tetranthus thymoides* Griseb.), *N. Brittonii* (*Thymopsis Brittonii* Greenm.), *Cirsium Smallii* Britton (*C. pinetorum* Small, not Greenm.), *Hymenostomum flavescens* E. G. Britton, *Amblystegium Siphon* E. G. Britton (*Hypnum Siphon* Beauv.), *Verrucaria mamillaris* Riddle, *Porina Wilsonii* Riddle, *P. macrocarpa* Riddle, *P. subfirmula* Riddle, *Microthelia quadriloculata* Riddle, *Anthracotheceium subglobosum* Riddle, *Tomasellia exumana* Riddle, *T. macrospora* Riddle, *Trypethelium eluteriae* var. *subsulphureum* Riddle (*Pseudopyrenula eluteriae* subsp. *subsulphurea* Wainio), *Parathelium microcarpum* Riddle, *Campylothelium decolorans* Riddle, *Lithothelium bahamense* Riddle, *Opegrapha isabellina* Riddle, *O. bahamensis* Riddle, *O. columbina* Riddle, *Chiodecton cruentatum* Riddle, *C. Bracei* Riddle, *Ionaspis tropica* Riddle, *Bilimbia aurata* Riddle, *B. molybditis* Riddle (*Biatora molybditis* Tuck.), *Bacida medialis* Riddle (*Lecidia medialis* Tuck.), *Ocellularia subtilis* Riddle (*Thelotrema subtile* Tuck.), *Thelotrema paralbium* Riddle, *Leptotrema simplex* Riddle (*Thelotrema simplex* Tuck.), *L. bisporum* Riddle (*Thelotrema bisporum* Nyl.), *Caloplaca galactophylla* Riddle (*Placodium galactophyllum* Tuck.), *C. aurantiaca* var. *isidiosella* Riddle (*Lecanora aurantiaca* var. *isidiosella* Crombie), *C. aurantiaca* var. *diffracta* Riddle (*Callophisma aurantiacum* var. *diffractum* Mass.), *Liagora pedicellata* M. A. Howe, *L. mucosa* M. A. Howe, *Grallatoria* M. A. Howe gen. nov., *G. reptans* M. A. Howe, *Gracilaria lacinulata* M. A. Howe (*Fucus lacinulatus* Vahl), *Laurencia nana* M. A. Howe, *Chondria Collinsiana* M. A. Howe, *Amphibia pectinata* M. A. Howe (*Bostrychia Vieillardii pectinata* Kütz.), *A. Sertularia* M. A. Howe (*Bostrychia Sertularia* Mont.), *Herposiphonia bipinnata* M. A. Howe, *Dasyopsis Antillarum* M. A.

Howe, *D. spinuligera* M. A. Howe (*Dasya spinuligera* Collins & Herv.), *Spermothamnion speluncarum* M. A. Howe (*Rhodocorton speluncarum* Collins & Hervey), *S. gymnocarpum* M. A. Howe, *Haloplegma Duperreyi spinulosum* M. A. Howe, *Ochtodes secundiramea* M. A. Howe (*Hypnea? secundiramea* Mont.), *Fosliella* M. A. Howe nom. nov., *F. farinosa* (*Melobesia farinosa* Lamour.), *F. Lejolisii* M. A. Howe (*Melobesia Lejolisii* Rosan.), *F. Chamaedoris* M. A. Howe (*Lithophyllum Chamaedoris* Fosl. & Howe), *Hydroclathrus clathratus* M. A. Howe (*Encoelium clathratum* (Bory) Ag.), *Padina Vickersiae* Hoyt, *Pseudotetraspora Antillarum* M. A. Howe, *Valonia ocellata* M. A. Howe, *Caulerpa paspaloides compressa* M. A. Howe (*C. paspaloides* var. *typica* f. *compressa* Webb. v. Bosse), *Bryobesia cylindrocarpa* M. A. Howe, *Codium intertextum* var. *cribrosum* M. A. Howe, *Aphanocapsa Howeii* Collins, *Gloeocapsa bahamensis* Collins, *Entophysalis violacea* Collins, *Phormidium pulvinatum* Collins, *Dimerosporium zonatum* Seaver, *Phyllachora Ateleiae* Seaver, *P. fusicarpa*, *P. Galactiae* Earle, and *Ophiodothis bahamensis* Seaver.—J. M. Greenman.

1430. COCKERELL, T. D. A. A new form of *Stanleya*. *Torreyia* 20: 101, 102. 1920.—*Stanleya glauca latifolia*, collected at Edith, Kansas, in May, 1920, is described. This may later prove to be a distinct species.—J. C. Nelson.

1431. CREMATA, MERLINO. Una excursión botánica a Isla de Pinos. [A botanical excursion to the Isle of Pines.] *Revist. Agric. y Trab.* 3: 47-49. 3 fig. 1920.—A collecting trip was made to the Isle of Pines by the author and DR. JUAN T. ROIG. The following new species were collected: *Erythroxyylon Roigii* Britton & Wilson and *Torrubia insularis* Standley. Other rare and interesting species were collected.—F. M. Blodgett.

1432. DEANE, WALTER, AND M. L. FERNALD. A new albino raspberry. *Rhodora* 22: 112. 1920.—A white-fruited form of *Rubus idaeus* L. var. *canadensis* Richardson, collected on Caribou Mountain, Mason, Maine, is published by the authors as *Rubus idaeus* L., var. *canadensis* Richardson, forma *Warei*. The plant was discovered by R. A. WARE and has amber-white or honey-colored fruit.—James P. Poole.

1433. DE WILDEMAN, E. Notes sur des espèces continentales africaines du genre "Baphia" Afzelius. [Notes on the continental African species of the genus *Baphia* Afz.] *Ann. Sci. Nat. Bot.* X, 1: 201-224. 1919.—After an analytic key for the genus, the following new species are described: *Baphia Bergeri*, *B. Claessensi*, *B. Dewevrei*, *B. Gilleti*, *B. Klainei*, *B. longepedicellata*, *B. odorata*, *B. Pierrei*, *B. Solheidi*, *B. Verschuereni*. The description of one new variety of *B. Klainei* var. *patulo-pilosa* is also given.—J. P. Kelly.

1434. ENGLER, A., AND P. GRAEBNER. Ein neues *Polygonatum*. [A new *Polygonatum*.] *Notizbl. Bot. Gart. Berlin* 7: 54 (398). 1920.—*P. Beyrodtianum* is described from Japan.—H. A. Gleason.

1435. FAWCETT, WILLIAM, AND ALFRED BARTON RENDLE. *Flora of Jamaica containing descriptions of flowering plants known from the island.* Vol. IV, Part ii. XV + 369 p., 114 text illustrations. Printed by order of the trustees of the British Museum (Natural History) London, 1920.—The present volume is continued on the same lines as volume III and includes the families Leguminosae to Callitrichaceae. The following new names, varieties and combinations are herein published: *Crotalaria sagittalis* L. var. *fruticosa* (C. *fruticosa* Mill.), *Indigofera suffruticosa* Mill. forma *obtusifolia*, *Sesbania Sesban* (*Aeschynomene Sesban* L.), *Aeschynomene biflora* (*Cassia biflora* Mill.), *Zornia tetraphylla* (*Myriadenus tetraphyllus* DC.), *Desmodium intortum* (*Hedysaum intortum* Mill.), *D. purpureum* (*Hedysaum purpureum* Mill.), *Vigna peduncularis* (*Phaseolus peduncularis* HBK.), *V. antillana* (*Phaseolus antillanus* Urb.), *Cassia fasciata* (*Chamaecrista fasciata* Britton), *Entada gigas* (*Mimosa gigas* L.), *Albizzia Berteriana* (*Pithecolobium Berterianum* Benth.), *Zygia latifolia* (*Mimosa latifolia* L.), *Enterolobium mangense* (*Mimosa mangensis* Jacq.), *Linum jamaicense* (*Cathartolimum jamaicense* Small) *Picraena antillana* (*Rhus antillana* Eggers), *Bursera Hollickii* (*Terebinthus Hollickii* Britton), *Mescagnia Hiraea* (*Triopteris Hiraea* Gaertn.), *Croton*

laurinus Sw. var. *adenophyllus* *Cadenophyllus* Spreng., *Gymnanthes integra* (G. *glandulosa* Pax, not Muell. Arg.), and *Euphorbia nirurioides* (*Chamaesyce nirurioides* Millsp.).—J. M. Greenman.

1436. FERNALD, M. L. Some variations of *Cardamine pratensis* in America. *Rhodora* 22: 11-14. 1920.—In North America there occur the naturalized *Cardamine pratensis* with pink petals; the indigenous white-flowered *C. pratensis* var. *palustris*; the pink-flowered variety *angustifolia* of the Arctic regions which varies from the typical *C. pratensis* in leaf characters as well as its range; and the pink-flowered double-flowered form *C. pratensis* forma *plena*. A discussion of these variations, their history, and their ranges, is followed by a key. The synonymy, bibliography, and distribution of each is given.—James P. Poole.

1437. FERNALD, M. L. The northern variety of *Ranunculus hispidus*. *Rhodora* 22: 30-31. 1920.—At the southern border of its range this plant has erect pubescence, but northward the hirsute plant becomes rare and gradually gives way to a commoner variation with pubescence appressed or even almost or quite wanting. From New England and New York this plant with appressed pubescence extends westward to Iowa, and south to the mountains of North Carolina, West Virginia, Missouri, and Kansas; while the typical *R. hispidus* extends well into Georgia and Arkansas. The writer proposes this more northern extreme as *Ranunculus hispidus* Michx. var. *falsus*, n. var., giving the description, distribution, and a list of characteristic specimens. Many of these specimens were distributed as *R. septentrionalis*, a northern species of swamps and meadows with much coarser stems and leaves and with stout and very long repent stolons developing soon after the expansion of the first flowers.—James P. Poole.

1438. FERNALD, M. L. *Polygala paucifolia* Willd., forma *vestita*, n. f. *Rhodora* 22: 32. 1920.—The typical *P. paucifolia* has the leaves green and quite glabrous except for a slight ciliation and sometimes a little pilosity on the midrib. This new form which the writer proposes has the leaves densely pilose with canescent hairs, and is conspicuous when growing on account of its pale foliage. The type specimen is from the northwestern base of Fall Mountain, Walpole, New Hampshire, where it was collected in 1917.—James P. Poole.

1439. FERNALD, M. L. The American varieties of *Pyrola chlorantha*. *Rhodora* 22: 49-53. 1920.—The author gives descriptions and bibliographies of the typical *Pyrola chlorantha* and of its varieties occurring in America, with a key and discussions as to the distinguishing differences between them. The varieties are published as new varieties or new combinations in each case. The writer attempts no solution as to their status.—James P. Poole.

1440. FERNALD, M. L. *Scirpus acutus* Muhl. *Rhodora* 22: 55-56. 1920.—The writer finds that when, in 1904, Mrs. CHASE proposed *Scirpus occidentalis* (Wats.) Chase, as one of four species which had been passing under the aggregate name *S. lacustris* L., she overlooked the clear description given in BIGELOW's "Florula Bostoniensis" of *S. acutus*, a new species ascribed by BIGELOW to MUHLENBERG. Somewhat later MUHLENBERG himself published *S. acutus*, contrasting it with his *S. lacustris* (the *S. validus* of Mrs. CHASE's treatment). BIGELOW's description and MUHLENBERG's unquestionably define *S. occidentalis*, and the type station, "deep water at Fresh Pond," is likewise conclusive, for *S. occidentalis* was often collected in Fresh Pond in the days prior to its conversion into a reservoir, but the old collections show no material of *S. validus* from the pond. The writer therefore revives the name *Scirpus acutus* Muhl. The bibliography and the synonyms are given.—James P. Poole.

1441. FERNALD, M. L. A flora of the Penobscot Bay Region. [Rev. of: HILL, ALBERT FREDERICK. The vascular flora of the Eastern Penobscot Bay Region, Maine. Proc. Portland [Maine] Soc. Nat. Hist. 3: 199-304. 1919.] *Rhodora* 22: 91-96. 1920.—See Bot. Absts. 3, Entry 1810.

1442. GAGNEPAIN, F. *Barringtonia* et *Decaspermum* nouveaux. [New species of *Barringtonia* and *Decaspermum*.] Bull. Mus. Hist. Nat. [Paris] 26: 72-74. 1920.—*Barringtonia Eberhardtii*, *B. edaphocarpa*, and *Decaspermum cambodianum* from southeastern Asia are described as new.—E. B. Payson.

1443. GAGNEPAIN, F. Un genre nouveau de Composées, *Blumeopsis*. [Blumeopsis, a new genus of the Compositae.] Bull. Mus. Hist. Nat. [Paris] 26: 75-76. 1920.—*Blumeopsis* is proposed as a genus new to science and to it is assigned one species, *B. flava* (*Blumea flava* DC.), from southeastern Asia.—E. B. Payson.

1444. GAMBLE, J. S. The Indian species of *Mimosa*. Bull. M'sc. Inf. Kew 1920: 1-6. 7 fig. 1920.—Seven species of *Mimosa* are recognized as occurring in British India. These species are contrasted by means of a key and figures illustrating the characteristics of the leaflets. The following species are described as new to science: *M. himalayana*, *M. Barberi*, *M. Prainiana*.—E. Mead Wilcox.

1445. GODFERY, M. J. *Epipactis viridiflora* Reich. Jour. Botany 58: 33-37. Pl. 553. 1920.—This is supplementary to a paper in Jour. Botany 57: 37-42. *E. viridiflora* var. *leptochila* Godfery is contrasted with *E. latifolia* All., which most continental authors consider a mere form or variety. In the first portion of the paper, differences in vegetative organs are considered; and in the second portion differences in reproductive organs are taken up. The root systems of the two are very different. Also the leaf arrangement is different; in *E. viridiflora* it is distichous, while in the other species the leaves are in a six-ranked rosette. Many differences were found in the flowers, most of which are illustrated in the plate. These differences lie in the form of the top of the ovary, the sessile or stalked acute or obtuse anther, and the projection of the pollinia. The rostellum in one species is minute and withered; in the other, large and persistent. The more conservative nature of floral variation is noted; hence the importance of the differences mentioned. The relation of structure to reproduction in *Anacamptis pyramidalis* is taken as an example of the above statement, and outlined. These differences between *E. viridiflora* and *E. latifolia* are correlated with remarkable functional changes. *E. latifolia* is pollinated by wasps, and the pollen is not friable, but is carried as a pollinium. Self-fertilization seems impossible. In *E. viridiflora* var. *leptochila* the viscid gland is reduced and inoperative, and "fertilization" by insects does not occur, or at least is rare. It is shown how the contents of the anther slide down onto the viscid surface of the stigma, producing self-fertilization. In *E. viridiflora* var. *denensis*, the pollen is very friable even before the flower opens. *E. viridiflora* was originally fertilized by insects, but has lost that function. MÜLLER believed that cross-fertilization in *E. viridiflora* occasionally occurred, due to aphids; but the author thinks this very exceptional. MÜLLER studied the two species most minutely, and said that we have here two form cycles which differ by thoroughly essential characters, and have the same claim to be considered distinct species as any two species of a genus.—K. M. Wiegand.

1446. GUILLAUMIN, A. Contribution à la Flore de la Nouvelle-Calédonie. [Contribution to the Flora of New Caledonia.] Bull. Mus. Hist. Nat. [Paris] 26: 77-84. 1920.—In continuation of previous similar lists, species belonging to many families are listed, and various collections of them are cited with the collectors' numbers and stations at which they were taken. The following species are described as new: *Utricularia canacorum* Pellegri and *Litsea ripidion*.—E. B. Payson.

1447. HAYATA, BUNZŌ. Icones Plantarum Formosanarum nec non et contributiones ad floram Formosanam. [Icons of the plants of Formosa, and materials for a flora of the island, based on a study of the collections of the botanical survey of the Government of Formosa.] Vol. IX. 155 p., 8 pl., 55 fig. Bureau of Forestry, Government of Formosa: Taihoku. March 25. 1920.—The present volume continues the results of studies on the formosan flora and includes the families Ranunculaceae to Araceae, arranged in the sequence of BENTHAM and HOOKER. The following new species and varieties are proposed: *Clematis garanbiensis*, *Illicium leucan-*

thum, *I. randaiense*, *Kadsura Matsudai*, *Eurya leptophylla*, *E. Matsudai*, *Camellia theifera* (Griff.) Dyer var. *assamica* (Masters) (*Thea chinensis* Hayata, in part, not Sins), *Actinidia guaphalocarpa*, *Reevesia formosana*, *Phellodendron Wilsonii* Hayata & Kanehira, *Euonymus acutorhombifolia*, *E. batakensis*, *E. kuranensis*, *E. Matsudai*, *Celastrus patentiflorus*, *Cassine Matsudai*, *Crotalaria akoensis*, *Indigofera mansuensis*, *I. venulosa* Champ. var. *glauca*, *Tephrosia ionophlebia*, *Milletia taiwaniana*, *Desmodium akoense*, *D. Shimadai*, *Uraria formosana* (*Desmodium formosanum* Hayata), *U. yaeyamensis*, *Glycine pescadrensis*, *G. subonensis*, *G. tomentella*, *Galactia lanceolata*, *Phaseolus heterophyllus*, *P. rotundifolius*, *Vigna acuminata*, **Dolichovigna** new genus of Leguminosae, *D. formosana*, *D. rhombifolia*, *Dolichos Lablab* L. var. *dolichocarpa*, *Albizzia longepedunculata*, *Spiraea tarokoensis*, *Filipendula kiraishiensis*, *Viburnum Matsudai*, *V. taihasense*, *V. villosifolium*, *Lonicera japonica* Thunb. var. *sempervillosa*, *L. rubropunctata*, *L. skintencensis*, *Uncaria formosana* (*Ouroparia formosana* Hayata), *U. uraiensis*, *Cephalanthus glabrifolius*, *C. ratocensis*, *Dentella Matsudai*, *Hedyotis kuranensis*, *Anotis formosana*, *Mussaenda albiflora*, *Chomelia gracilipes*, *C. kotoensis*, *C. lancifolia*, *Randia suishaensis*, *Diplospora* (?) *buisanensis*, *Icra graciliflora*, *Psychotria* (?) *kotoensis*, *P. macrophylla*, *Lasianthus hiiranensis*, *L. microstachys*, *L. parvifolius*, *Paderia uraiensis*, *P. villosa*, *Damnacanthus Tashiroi*, *Rhododendron nankotaisanense*, *Symplocos kiraishiensis*, *S. Somai*, *S. sozanensis*, *Jasminum Shimadai*, *Osmanthus bibracatus*, *O. daibuensis*, *O. gamostromus*, *O. Matsudai*, *Gardneria hongkongensis*, *Erycibe acutifolia* (*E. obtusifolia* Hayata, not Benth.), *Ambulia stipitata*, *Lindernia stellariifolia*, *L. cruciformis*, *Mimulus formosana*, *Bonnaya aristato-serrata*, *Torenia hokutensis*, *T. nantoensis*, *Hygrophila pogonocalyx*, *Strobilanthes lasiocalyx*, *S. longespicaus*, *S. prionophyllus*, *S. rantanensis*, *S. Tashiroi*, *Dicliptera uraiensis*, *Helicia hainanensis*, *Elaeagnus buisanensis*, *E. convexolepidota*, *E. daibuensis*, *E. erosifolia*, *E. grandifolia*, *E. longidrubra*, *E. nokocensis*, *E. oiwakensis*, *E. paucilepidota*, *Phyllanthus oligospermus*, *P. takaoensis*, *Glochidion chademenosocarpum*, *G. hypoleucum*, *G. kotonese*, *G. kusukusense*, *G. sphaerostigmum*, *G. suishaense*, *Antidesma acutisepalum*, *A. hiiranense*, *A. rotundisepalum*, *Acalypha kotoensis*, *A. longe-acuminata*, *A. Matsudai*, *Claoxylon kotoense*, *Alchornea kelungensis*, *A. lochoensis* (*A. trewioides* Hayata, not Muell. Arg.), *Euphorbia garanbiensis*, *E. liukiensis*, *E. Tashiroi*, *Zelkova formosana*, *Z. tarokoensis*, *Lithocarpus Nakaii*, *L. Matsudai*, *Dendrobium alborivide*, *Bulbophyllum Somai*, *Eria Matsudai*, *Calanthe Takeoi*, *C. Matsudai*, *Vanilla ronoensis*, *Galeola Matsudai*, *Gastrochilus Matsudai*, *Orchis kiraishiensis*, *Alpinia agiokucensis*, *A. densespicata*, *A. dolichocephala*, *A. hokutensis*, *A. kusshakucensis*, *A. mediomaculata*, *A. suishaensis*, *A. tonrokucensis*, **Pseudo-smilax** new genus of Liliaceae, *P. seisuiensis*, *P. hogoensis*, *Smilax formosana*, *S. herbacea* L. var. *daibuensis*, *S. horridiramula*, *S. ovato-rotunda*, *S. taiheiensis*, *S. takaoensis*, *S. tenuissima*, *S. trachyclada*, *Heterosmilax raishaensis*, *Polygonatum arisanense*, *P. officinale* All. var. *formosanum*, *Smilacina formosana*, *Paris arisanensis*, *Metanarthecium formosanum*, *Aspidistra daibuensis*, *A. mushaensis*, *Heloniopsis acutifolia*, *Arisaema quinquefoliola*, and *A. Matsudai*.—J. M. Greenman.

1448. HENRY, AUGUSTINE, AND MARGARET G. FLOOD. **The Douglas firs: a botanical and silvicultural study of the various species of *Pseudotsuga*.** Proc. Roy. Irish Acad. B, 35: 67-90. Pl. 12-14. 1920.—See Bot. Absts. 7, Entry 331.

1449. HITCHCOCK, A. S. **The genera of grasses of the United States with special reference to the economic species.** U. S. Dept. Agric. Bull. 772. 307 p., 20 pl., 174 fig. Government Printing Office: Washington. 1920.—All genera of grasses are described that embrace native, introduced, or cultivated species in the United States. Under each genus reference is made to the type species and to species of economic importance, both useful and harmful plants. The economic consideration takes into account the grasses that are used for hay or pasture purposes, for cereal and sugar production, those used in broom and paper making, and the ornamental species. Throughout the paper the word "grass" is used strictly in its botanical sense; that is, as applying only to the plants of the family Poaceae or Gramineae. The keys to the tribes and genera are arranged in a simple, workable way; and these, together

with an illuminating half-natural-size photograph or sketch of a representative species under each genus, should enable the amateur botanist readily to fix in his mind the generic characteristics, and, indeed, the species typifying the genus. A brief of the publication of each generic name is given, and the reason is stated for choosing the species taken as a type. The arrangement of the material, in general, differs from that of previous contributions on the subject in that the tribes have been placed in a new sequence, based upon the complicity of the flower structure, the simplest or most primitive being placed first and the most highly developed being given last. According to the author's researches, the tribal arrangement as presented is the closest approximation to the natural relationship that can be shown in sequence. Accordingly, the bamboos (Bamboseae) are listed first, as certain genera embraced in this tribe are of the simplest floral structure. The following points are of special interest to agrostologists: *Munroa* has been placed under the tribe Chlorideae. *Triodia* has been restored; and while the species embraced in this genus are variable in habit and in floral character, the author does not deem it practicable to segregate any of them into distinct genera. *Aira* has been restored and *Deschampsia* relegated to synonymy under it. *Aspris* is used for three annual economically unimportant species heretofore carried under *Aira*. *Agrostis palustris* is the name given for *A. alba*, cultivated redtop. *Agrostis capillaris* replaces what has been considered a variety of cultivated redtop, *A. alba vulgaris*. The synonymy is complete for generic names based on American species. The lifelike sketches of representative species by MRS. GILL and the detailed taxonomic drawings by Assistant Agrostologist, MRS. AGNES CHASE, practically all of which are new, are exceedingly helpful in the recognition of the species typifying each genus.—Arthur W. Sampson.

1450. HOEHNE, F. C. *Catálogo do Herbario e das espécies cultivadas no Horto "Oswaldo Cruz" com a indicação daquellas que existem em duplicata e poderão ser cedidas em permuta.* [Catalogue of the herbarium and of the species cultivated in the Garden of "Oswaldo Cruz" with an indication of those which exist in duplicate and which may be given in exchange.] 8 vo., 48 p. São Paulo, 1919.

1451. HOLM, THEO. *Antennaria alpina* and *A. carpathica*. *Rhodora* 22: 138-142. 1920.—The author argues that these species should not be excluded from the flora of this continent, but that both species exist in Canada as well as in the United States. He believes that *A. alpina* (L.) R. Br. is polymorphic and is represented on this continent by various forms which have been separated as varieties and even as species, such as *A. glabrata* Greene and *A. mucronata* E. Nelson. Likewise, *A. carpathica* (Wahlenb.) R. Br. is claimed to be represented on this continent by *A. lanata* Greene.—James P. Poole.

1452. HOLMBERG, OTTO R. *Einige Puccinellia-Arten und Hybriden.* [Some *Puccinellia* species and hybrids.] *Bot. Notiser* [Lund] 1920: 103-111. May, 1920.—Four species and six hybrids are discussed. Several new names or combinations for these are proposed.—P. A. Rydberg.

1453. HUTCHINSON, J. *Clematopsis*, a primitive genus of *Clematideae*. *Bull. Misc. Inf. Kew* 1920: 12-22. 5 fig. 1920.—*Clematopsis* Bojer, previously in manuscript only or applied to species as a *nomen nudum*, is taken up for a group of the *Clematideae* from tropical Africa, South Africa, and Madagascar. Typical *Clematis* species have opposite leaves and sepals that are induplicate-valvate in the bud. A valvate aestivation is considered derived from an imbricate one, at least in the *Ranales*. In *Clematopsis* there is a gradation in aestivation characters from simple imbricate to a type of induplicate-valvate arrangement that approaches closely the condition in *Clematis*. One species of *Clematopsis* produces at times alternate leaves. It is held that the present genus is a primitive one in the tribe and connects that tribe with the *Anemoneae*. The following new combinations are made and new species published: *Clematopsis Kirkii* (*Clematis Kirkii* Oliv.), *C. Teuczii* (*Clematis villosa* var. *Teuczii* O. Ktze), *C. speciosa*, *C. chrysocarpa* (*Clematis chrysocarpa* Welw.), *C. argentea*, *C. katangensis*, *C. Oliveri*, *C. Stuhlmannii* (*Clematis Stuhlmannii* Hieron.), *C. trifida* (*Clematis trifida* Hook.), *C. scabiosifolia* (*Clematis scabiosifolia* DC.), *C. Stanleyi* (*Clematis*

Stanleyi Hook.), *C. oligophylla* (*Clematis oligophylla* Hook.), *C. anethifolia* Bojer (*Clematis anethifolia* Hook.), *C. pimpinellifolia* Bojer (*Clematis pimpinellifolia* Hook.), *C. villosa* (*Clematis villosa* DC.). A key is given to the 15 recognized species, and specimens are cited.—*E. Mead Wilcox.*

1454. JENNINGS, O. E. *Impatiens pallida* forma *speciosa* f. nov. Ohio Jour. Sci. 20: 204. 1920.—A description is given of this new variety of *Impatiens pallida* with pale cream colored flowers. The type specimen was collected in Schenley Park, Pittsburgh, Pennsylvania.—*H. D. Hooker.*

1455. JUMELLE, H. Un *Jatropha dioique* de Madagascar. [A dioecious *Jatropha* from Madagascar.] Rev. Gen. Botany 32: 121-124. 1920.—A description of *Jatropha mahafalensis* the "betatatra" of Madagascar. This species differs from the others of the genus in being dioecious.—*L. W. Sharp.*

1456. KNOWLTON, C. H., AND WALTER DEANE. Reports on the Flora of the Boston District —XXXIII. *Rhodora* 22: 123-127. 1920.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reported species and their distribution in the district about Boston, Massachusetts.—*James P. Poole.*

1457. KOPS, JAN, F. W. VAN EEDEN, AND L. VUYCK. *Flora Batava. Afbeelding en beschrijving der Nederlandsche gewassen.* [Flora of Holland. Illustrations and descriptions of the plants of Holland.] Folio. Parts 400-401. Pl. 1993-2000 [colored]. Martinus Nijhoff: 's-Gravenhage, 1920.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The vascular plants are: *Solanum triflorum* Nutt. and *Stipa Ncesiana* Trin. & Rupr. [See also Bot. Absts. 5, Entry 2347.]—*J. M. Greenman.*

1458. LACAITA, C. C. *Quercus aegilops*. Bull. Misc. Inf. Kew 1920: 100-105. 1920.—It still remains most probable that *Q. aegilops* L. is to be identified with the Vallonea oak of commerce.—*E. Mead Wilcox.*

1459. LAUTERBACH, C. Beiträge zur Flora von Papuasien VII, no. 64. Die Burseraceae Papuasien. [The Burseraceae of Papuasias.] Bot. Jahrb. 56: 317-344. 4 fig. 1920.—The Burseraceae are represented in Papuasias by only the genera *Canarium* and *Santiria*. Few species were formerly known, but the collections of LEDERMANN have greatly increased the number, until now 21 species of *Canarium* and 12 of *Santiria* are known. Of the species of *Canarium* a few occur elsewhere, occasionally in cultivation, but mostly endemic. They are tall trees, usually inhabiting the lowlands. The limited distribution of species in both genera may be due to the short period in which the seed is viable, a condition common in most oily seeds. The seeds are distributed by animals, rarely or never by streams except when whole trees are swept downstream. The species of *Santiria* are all endemic. Three are low trees. The genus ranges through all altitudes. Keys to the genera and species are given; also notes and synonymy on the various species. The following species, varieties, and forms are proposed as new: *Canarium moluccanum* Bl. var. *palla* and forma *porphyropyrena*, *C. grandistipulatum*, *C. kaniense*, *C. Branderhorstii*, *C. maluense*, *C. pachypodum*, *C. furfuraceum*, *C. aemulans*, *C. Tamborae*, *C. Ledermanni*, *C. Schlechteri*, *C. fulvum*, *C. appendiculatum*, *Santiria Schlechteri*, *S. sepilensis*, *S. maluensis*, *S. Ledermanni*, *S. leaeifolia*, *S. nubigena*, *S. caudata*, *S. triphylla*, *S. lamprocarpa*, and *S. anisandra*.—*K. M. Wiegand.*

1460. LAUTERBACH, C. Beiträge zur Flora von Papuasien VII, no. 65. Die Simarubaceen Papuasien. [The Simarubaceae of Papuasias.] Bot. Jahrb. 56: 341-344. 1 fig. 1920.—This family is represented in Papuasias by five genera, each containing a single species. Only two of these are forest species, the other three being strand plants. The distribution of the strand species is aided by the water currents, as the fruits are well adapted for floating. The species are all found in other countries. The genera listed are *Suriana*, *Samadera*, *Brucea*, *Picrasma*, and *Soulamea*. A key to the genera is given; also notes are given on distribution and nomenclature of the species. *Samadera indica* Gaertn. var. *papuana* is described as new.—*K. M. Wiegand.*

1461. LAUTERBACH, C. Beiträge zur Flora von Papuasien, VII, no. 66. Die Anacardiaceen Papuasien. [The Anacardiaceae of Papuaasia.] Bot. Jahrb. 56: 345-373. 5 fig. 1920.—Twelve genera and 46 species are listed from Papuaasia, of which two genera are endemic. Three genera contain cultivated, or at least economic, species. Sixty-two per cent of the species are endemic. Most of the species inhabit the low-lands, especially in the alluvial swamps along the rivers, where they often form an important part of the woody flora. One species, at least, is a myrmecophile. A few species reach the higher mountain summits. A key is provided to the genera and to the species under each genus. The following varieties, species, and combinations are proposed as new: *Buchanania nova-hibernica*, *B. montana*, *B. macrocarpa*, *B. scandens*, *Mangifera xylocarpa*, *Skoliosigma defolians*, *Pentaspadon Moszkowskii*, *Campnosperma montana*, ?*Euroschinus Ledermannii*, *Rhus lenticellosa* Lauterb. var. *monophylla* and var. *pentaphylla*, *R. caudata*, *Nothopegiopsis nidificans*, *Semecarpus myrmecophila*, *S. nubigena*, *S. Schlechteri*, *S. fulvo-villosa*, and *S. bracteata*. The genus *Skoliosigma* is described as new. Synonymy and nomenclatorial references are given, as well as notes on distribution, morphology, and ecology.—K. M. Wiegand.

1462. LEWIN, L. Ueber einige Pflanzen aus dem Küstengebiet von Beludschistan. [On some plants from the coastal region of Baluchistan.] Bot. Jahrb. 56 (Beibl. 123): 31-36. 1920.—A list of 63 plants is given, collected by MESSRS. POSSMANN and PALMER along the coast of Baluchistan, and determined by PAUL HENNINGS and PAUL ASCHERSON. Of these, 38 had not previously been reported from the northern and northwestern portions of that country. The native names are added where known. The narrow strip of sandy country between the mountains and the coast supports a type of semi-desert vegetation quite different from the flora farther inland. Published records of Baluchistan plants are few; two based on STOCK's collections are mentioned.—K. M. Wiegand.

1463. LOWNES, ALBERT E. Notes on *Pogonia trianthophora*. *Rhodora* 22: 53-55. 1 fig. 1920.—This rather rare orchid was first reported in the region about Asquam Lake, New Hampshire, in 1898, from one station. Six stations are now known, scattered over a comparatively small area, and containing between five and six thousand plants. The writer gives a few brief notes as to its manner of growth, method of fertilization, method of propagation, habit of withdrawing moisture from the tubers in time of drought, and habit, which is peculiar for our native orchids, of opening only on clear days and closing during cloudy weather and at night.—James P. Poole.

1464. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. IV, Part 9. 239-304 p., pl. 160-163. William Applegate Gullick: Sydney, 1920.—The present part contains descriptions, synonymy, notes, and illustrations of the following species: *Eucalyptus Torelliana* F. v. M., *E. corymbosa* Smith, *E. intermedia* R. T. Baker, *E. patellaris* F. v. M., *E. celastroides* Turcz., *E. gracilis* F. v. M., *E. transcontinentalis* Maiden, *E. longicornis*, F. v. M., *E. oleosa* F. v. M., *E. Floctoniae* Maiden, *E. virgata* Sieber, *E. oreades* R. T. Baker, *E. obtusiflora* DC., and *E. fraxinoides* Deane & Maiden. *Ibid.* Part 10. P. 305-343. Pl. 164-167. March, 1920.—This part continues the series with a like treatment of: *E. terminalis* F. v. M., *E. dichromphloia* F. v. M., *E. pyrophora* Benth., *R. pyrophora* Benth. var. *polycarpa* (*E. polycarpa* F. v. M.), *E. laevopinea* R. T. Baker, *E. ligustrina* DC., *E. stricta* Sieber, and *E. grandis* (Hill) Maiden.—J. M. Greenman.

1465. METCALF, F. P. Notes on North Dakota plants. Jour. Washington [D. C.] Acad. Sci. 10: 188-198. 1920.—A list of marsh and aquatic plants of the state, including 18 species not previously reported.—Helen M. Gilkey.

1466. MOORE, SPENCER LE M. Alabastra Diversa. Part XXXII. Jour. Botany 58: 44-49. 1920.—(1) *Plantae Congoenses novae vel rariores*. This contribution consists of notes on the Compositae and Acanthaceae of the Congo. Notes are given on five species of Compositae, three of which are new: *Vernonia divulgata*, *Aspilia congoensis*, and *Crassocephalum longirameum*. Thirteen species of Acanthaceae are listed, three of which are new:

Hygrophila Vanderystii, *Justicia fistulosa*, and *Rhinacanthus minimus*. (2) *Vaupelia* A. Brand. This, a genus of Boraginaceae, was removed by BRAND from the Cynoglosseae to the Lithospermeae. The close relationship of *Vaupelia* and *Cystistemon* Balf. f. was also noted by BRAND. As now understood *Vaupelia*, ranging from Somaliland to Angola, contains six species. In the "Flora of Tropical Africa" *V. macranthera* was wrongly merged in *Medusa*. A seventh and new species, *V. hispidissima* from Angola, is added in the present paper. It is related to *V. Medusa* Brand.—K. M. Wiegand.

1467. MOXLEY, GEORGE L. A study in *Zauschneria*. Southwest Sci. Bull. 1: 13-29. Pl. 2-4. May 5, 1920.—The following species are considered in this paper: *Z. californica* Presl., *Z. microphylla* (Gray), *Z. cana* Greene, *Z. villosa* Greene, *Z. Eastwoodae* Eastwood & Moxley sp. nov., *Z. latifolia* (Hook) Greene, *Z. viscosa* Moxley, *Z. velutina* Eastwood sp. nov., *Z. tomentella* Greene, *Z. Garretti* A. Nelson, *Z. arizonica* Davidson, *Z. Pringlei* Eastwood sp. nov., *Z. elegans* Eastwood sp. nov., *Z. crassifolia* Rydberg, *Z. glandulosa* Moxley, *Z. Hallii* Moxley sp. nov., *Z. pulchella* Moxley sp. nov., *Z. argentea* A. Nelson, and *Z. canescens* Eastwood sp. nov.—P. A. Munz.

1468. NELSON, JAMES C. [Rev. of: HITCHCOCK, A. S. The Genera of Grasses of the United States with special reference to the economic species. U. S. Dept. Agric. Bull. 772. 307 p., 20 pl., 174 fig. Government Printing Office: Washington, 1920.] *Torreyia* 20: 84-88. 1920.—In several respects this book marks an advance over our previous knowledge. A new sequence of tribes is proposed, by which the bamboos are placed first, as showing the least differentiation in floral structure, followed by the tribes Poatae and Panicatae. The tribes Oryzeae and Nazieae are placed with the Poatae. A new tribe, Zizanieae, is cut off from Oryzeae on the basis of the unisexual spikelets. *Munroa* is placed with the Chlorideae. *Triodia* is restored. The name *Aira* is taken up for *Deschampsia*, and *Aspris* is substituted for *Aira*. *Agrostis alba* L. becomes *A. palustris* Huds., and *A. alba* var. *vulgaris* Thurb. becomes *A. capillaris* L. The synonymy is complete for all generic names based on American species. The reason for selecting the species taken as the type is stated in all cases. Each genus is technically described, and all economic species mentioned. With two exceptions, all the illustrations are new. One new species (*Epicampes patens*) is described, and 14 new combinations are formally made.—J. C. Nelson.

1469. NICOLAS, G. Biologie florale de quelques ombellifères Nord-Africaines. [Floral biology of some North African umbellifers.] Rev. Gén. Bot. 32: 230-234. 1920.—See Bot. Abstr. 7, Entry 329.

1470. PAMMEL, L. H., AND C. M. KING. A variation in the black walnut, Proc. Iowa Acad. Sci. 25: 241-248. Pl. 3, fig. 43-44. 1920.—History and description, with figures of tree, bark, leaf, and fruit of a "mutant" walnut (*Jugland nigra*) with pyriform fruits.—H. S. Conard.

1471. PELLEGRIN, FRANÇOIS. Utriculaires nouvelles de l'Indo-Chine (Lentibulariaceae). [New Utricularias from Indo-China (Lentibulariaceae).] Bull. Mus. Hist. Nat. [Paris] 26: 180-183. 1920.—The following species are described as new to science: *Utricularia delphinioides* Thorel, *U. delphinioides* Thorel var. *minor*, *U. Geoffrayi*, *U. Lilliput*, *U. odorata*, and *U. Pierrei*.—E. B. Payson.

1472. PENNELL, FRANCIS W. Scrophulariaceae of the central Rocky Mountain states. Contrib. U. S. Nation. Herb. 20: 313-381. 1920.—This paper, the first of a series, discusses the genera *Verbascum*, *Linaria*, *Collinsia*, *Scrophularia*, *Chionophila*, and *Penstemon*, as represented in the central Rocky Mountain region, including Wyoming, Colorado, Utah, and Idaho east of the 113th meridian. It is introduced by a description of the physical features of the area and a list of localities at which specimens have been collected by DR. PENNELL. Full descriptive keys are given in genera of more than one species, and a list of specimens examined is given under each species. The paper is largely taken up with a revision of the

genus *Penstemon* (commonly known as *Pentstemon*) in the area covered, in which 86 species are listed, with 2 additional new species at the end. Keys to the groups and species are given, and the following new names occur: *Penstemon Jonesii*, *P. leptanthus*, *P. auriberbis*, *P. parviflorus*, *P. dolius* Jones, *P. Paysonii*, *P. eriantherus saliens* (Rydb.) Pennell, *P. ophi-anthus*, *P. parvus*, *P. magnus*, *P. leiophyllus*, *P. laevis*, *P. saxosorum*, *P. Uintahensis*, *P. cyaneus*, *P. cyananthus subglaber* (Gray) Pennell, *P. cyananthus longiflorus*, *P. scariosus*, *P. Garrettii*, *P. Caryi*, *P. strictus angustus*, *P. secundiflorus laevendulus*, *P. Osterhoutii*, *P. versicolor*, *P. lentus*, *P. coloradensis Sileri* (Gray) Pennell, *P. procerus pulvereus*, *P. aggregatus*, *P. obtusifolius*, *P. retrorsus* Payson, *P. caespitosus perbrevis*, *P. glabrescens*, *P. abietinus*, *P. Tidesstromii*, *P. mensarum*.—S. F. Blake.

1473. PIPER, CHARLES V. A study of *Allocarya*. Contrib. U. S. Nation. Herb. 22: 79-113. 1920.—In this study of the genus *Allocarya* Greene, of the family Boraginaceae, 79 species are recognized from North America north of Mexico, of which 48 are described as new. A key to the species is given, and distributed specimens are cited freely. The species are distinguished chiefly by characters drawn from the nutlets. The following are new: *Allocarya hystericula*, *A. acanthocarpa*, *A. oligochaeta*, *A. echinacea*, *A. cristata*, *A. Eastwoodae*, *A. glyptocarpa*, *A. spiculifera*, *A. anaglyptica*, *A. papillata*, *A. distantiflora*, *A. microcarpa*, *A. oricola*, *A. divergens*, *A. asperula*, *A. Wilcoxii*, *A. setulosa*, *A. stipitata micrantha*, *A. Leibergii*, *A. tuberculata*, *A. charaxata*, *A. ambigens*, *A. lonchocarpa*, *A. limicola*, *A. sigillata*, *A. eryocarpa*, *A. gracilis*, *A. laxa*, *A. pratensis*, *A. cervina*, *A. ramosa*, *A. calycosa*, *A. figurata*, *A. vallata*, *A. undulata*, *A. minuta*, *A. scalpta*, *A. reticulata*, *A. arcolata*, *A. inornata*, *A. media*, *A. divaricata*, *A. interrasilis*, *A. insculpta*, *A. dispar*, *A. granulata*, *A. conjuncta*, *A. corrugata*, *A. scalpocarpa*.—S. F. Blake.

1474. PITTIER, H. The Venezuelan mahogany, a hitherto undescribed species of the genus *Swietenia*. Jour. Washington [D. C.] Acad. Sci. 10: 32-34. 1920.—Though the tree has long been known economically, the Venezuelan mahogany has never before been critically studied and is now described as a new species, *Swietenia Candollei*.—Helen M. Gilkey.

1475. POUPION, J. *L'Inobulbon munificum* Kranzlin. Rev. Hort. [Paris] 92: 64-66. Fig. 15-16. 1920.

1476. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 2: 42-62. 1920.—The present article deals with Rosaceae. A classification of all the known species of *Malus* is given, and one new section, *Chloromeles* (Decne.), and new subsections are proposed. The following species, varieties, forms, and combinations based on spontaneous material are new: *Aronia arbutifolia* f. *leiocalyx* and f. *macrophylla*, *Photinia villosa* var. *coreana* (Decne.), \times *Amelanchier grandiflora* (Zabel) = *A. canadensis* \times *laevis* Weigand, *Malus kansuensis* f. *calva*, *M. honanensis*, *M. Komarovii* (Sarg.), *M. coronaria* var. *dasycalyx*, *M. angustifolia* f. *pendula*, *Docynia docynioides* (Schneid.), *Pyrus ussuriensis* var. *hondoensis* (Kikuchi & Nakai) and var. *ovoidea* (Rehd.), *P. Calleryana* var. *Fauriei* (Schneid.). The following new hybrids, forms and combinations are based on garden plants: \times *Sorbus arnoldiana*, *Aronia arbutifolia* var. *pumila*, *Amelanchier grandiflora* f. *rubescens*, *Malus baccata* f. *gracilis*, *M. floribunda* var. *brevipes*, *M. coronaria* var. *dasycalyx* f. *Charlottae*, *M. ioensis* f. *plena*, \times *M. robusta* and var. *persicifolia*, \times *M. sublobata* (Zabel), \times *M. purpurea* (Barbier), \times *Chaenomeles superba* (Frahm) with several forms, *Pyrus Calleryana* f. *graciliflora* and f. *tomentella* and \times *P. congesta*. There are also critical notes on other species of some of the genera mentioned above. (See also Bot. Absts. 4, Entries 1758, 1759).—Alfred Rehder.

1477. REHDER, ALFRED. *Tetraplasia*, a new genus of Rubiaceae. Jour. Arnold Arboretum. 1: 190-191. 1920.—*Tetraplasia biflora*, new genus and new species, related to *Plectronia* and *Vangueria*, is described; it is endemic to the Liukiu Islands.—Alfred Rehder.

1478. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 1: 191-210. 1920.—The present continuation of this paper deals with Saxifragaceae and Ranunculaceae and a few Pinaceae, Taxaceae, and Liliaceae. Besides many horticultural forms the following species, varieties, and combinations are new: *Juniperus squamata* f. *Wilsonii*, *Paeonia suffruticosa* var. *spontanea*, *Clematis paniculata* var. *dioscoreifolia* (Lév. & Vaniot), *Philadelphus rhombifolius* from Japan, *P. subcanus* var. *Wilsonii* (Koehne), *P. Delavayi* var. *calvescens*, *P. pekinensis* var. *dasycalyx*, *P. larus* var. *strigosus* (Beadle), *Fendlera linearis* from Mexico, *F. rupicola* var. *falcata* (Thornber), *Deutzia heterotricha* from Japan, and *D. calycosa* var. *macropetala* from China.—*Alfred Rehder*.

1479. RENDLE, A. B. *Poa omeiensis* comb. nov. Jour. Botany 58: 25. 1920.—A new name made necessary by the discovery that *P. gracillima* Rendle is antedated by *P. gracillima* Vasey. The plant in question is a Chinese species.—*K. M. Wiegand*.

1480. RIDDELSDELL, H. J. British Rubi, 1900-1920. Jour. Botany 58: 101-104. 1920.—This is a summary of the changes made in the interpretation of the British Rubi since the publication of ROGERS' hand-book. Most of the changes are due to ROGERS' work or have been done under his guidance. About fifty forms are mentioned.—*K. M. Wiegand*.

1481. RIDDELSDELL, H. J. Some records, and rose records. Jour. Botany 58: 113-114. 1920.—Records of the occurrence of *Callitriche*, *Zannichellia*, *Potamogeton*, *Eleocharis*, *Carex*, and various species of *Rosa*.—*K. M. Wiegand*.

1482. ROCK, JOSEPH F. The genus *Plantago* in Hawaii. Amer. Jour. Botany 7: 195-210. 1 pl. 1920.—A critical study of *Plantago* in Hawaii. The author recognizes two species, both endemic: *P. princeps*, with eight varieties, and *P. pachyphylla*, with seven varieties. *P. Queleniana* Gaud. is reduced to a variety of *P. princeps*. Two new varieties, *P. princeps* var. *anomala* and *P. pachyphylla* var. *musciicola*, are described, together with four new forms: *P. pachyphylla* var. *mauiensis* forma *montis eeka*, *P. pachyphylla* var. *kauaiensis* forma *robusta*, *P. pachyphylla* var. *kauaiensis* forma *intermedia*, and *P. pachyphylla* var. *rotundifolia* forma *crassicaulex*. Three species of *Plantago* have been introduced into Hawaii.—*E. W. Sinnott*.

1483. RUSBY, H. H. Codes of botanical nomenclature in the United States Pharmacopoeia. Jour. Amer. Pharm. Assoc. 9: 670-671. 1920.

1484. SALMON, C. E. *Alchemilla acutidens* in England. Jour. Botany 58: 112-113. 1920.

1485. SCHELLENBERG, G. Ueber einige Arten der Gattung *Rourea* Aubl. [Several species of the Genus *Rourea* Aubl.] Bot. Jahrb. 56: 21-29. 1920.—This genus has been very much misunderstood. The author in a previous contribution, in 1910, has shown that *Rourea* as understood by AUBLET is entirely American, and excludes the African *Byrsocarpus* and the Asiatic *Santaloides*. The author's early studies, based mainly on anatomical considerations, were primarily concerned with generic and subgeneric relationships and limitations. The preparation of a monograph for "Das Pflanzenreich" has brought out new information with regard to species, and has led to this paper. Material named *Rourea frutescens* Aubl. by most authors has been *Connarus pubescens* DC., or *Rourea pubescens* Radlk., or in some cases *R. surinamensis* Miq., or even *Cnestidium rufescens* Planch. *R. surinamensis* Miq. also has been misunderstood, and has been confused with *R. revoluta* Planch., and *R. glabra* HBK. *R. oblongifolia* Hook. & Arn. is apparently a synonym of *R. glabra* HBK. URBAN's *R. cubensis* and *R. sympetala* are to be referred to *R. glabra*. Of BAKER's three varieties of *R. glabra* only one, var. *parviflora*, is really a variety of this species. GRISEBACH confused also *R. paucifoliolata* Planch. with *R. glabra*. *R. oblongifolia* Hook. & Arn. and *R. glabra* HBK. are synonymous. The author notes that he was previously in error in the statement that the genus *Rourea* is characterized by sclerenchyma cells in the leaves. Only

R. ligulata Bak. possesses these cells. Species of Connaraceae are rarely characterized by a definite anatomical character. Genera and larger groups, however, possess good anatomical characteristics, especially the genus *Pseudoconnarus* Radlk. Several species are noted as being little known to the author. The value of the pubescence on the calyx as a specific character as used by BAKER is questioned.—K. W. Wiegand.

1486. SCHLECHTER, R. Eine weitere neue Vanda. [Another new Vanda.] Orchis 14: 2-4. 1920.—*Vanda luzonica* Loher. is described as new to science.—E. B. Payson.

1487. SCHLECHTER, R. Pelatantheria insectifera Ridl. Orchis 14: 7-10. 1920.—The history of this species is discussed at length, and the three known species of the genus are redescribed.—E. B. Payson.

1488. SCHLECHTER, R. Vanda concolor Bl. Orchis 14: 21-24. 1920.—A history of this species in literature and a description of the plant are given.—E. B. Payson.

1489. SCHLECHTER, R. Die Gattung Eulophiella Rolfe. [The genus Eulophiella Rolfe.] Orchis 14: 24-30. 1920.—The known facts concerning this Madagascan genus are here collected, and a key is given to the three recognized species. *E. Perrieri* is described as new to science.—E. B. Payson.

1490. SCHNEIDER, CAMILLO. Notes on American willows. IX. Jour. Arnold Arboretum 2: 1-25. 1920.—The present article deals with the section *Discolores* with 4 and the section *Griseae* with 5 species. The synonymy, nomenclature, distribution, and relationship of these 9 species and their varieties are discussed at length and the following 2 new varieties proposed: *Salix Scouleriana* var. *crassijulis* (Anderss.) and *S. petiolaris* var. *rosmarinoides* (Anderss.). (See also Bot. Absts. 3, Entries 1838, 1839; 4, Entries 1769, 1770; 5, Entry 1058.)—Alfred Rehder.

1491. SMALL, J. K. Cypress and population in Florida. Jour. New York Bot. Gard. 21: 81-86. Pl. 245-247. 1920.

1492. SMITH, J. J. Plantae novae vel criticae ex Herbario et Horto Bogoriensi I. [New or critical plants from the herbarium and garden of Buitenzorg I.] Bull. Jard. Bot. Buitenzorg, III, 1: 390-410. Pl. 38-56. June, 1920.—The following new species are described and figured: *Phyllanthus ovatifolius*, *Glochidion styliiferum*, *Dicoelia affinis*, *Baccaurea crassifolia*, *Claoxylon velutinum*, *Calophyllum grandiflorum*, *Clethra elongata*, *Rhododendron Vanvuurenii*, *R. fortunans*, *R. lomphohense*, *R. radians*, *Gaultheria celebica*, *Diplycosia celebensis*, *D. gracilipes*, *Vaccinium bigibbum*, and *V. latissimum*.—J. J. Smith.

1493. SURGIS, E. Contribution à l'étude des Frankéniacées. [A study of the Frankeniaceae.] Compt. Rend. Acad. Sci. Paris 170: 246-249. 1920.—This family is regarded as consisting of the following genera in addition to *Frankenia*: *Beassonia* Roxburgh, *Hypericopsis* Boissier, *Niederleinia* Hieronymus, and *Anthobryum* Philippi. To the last-named genus, which previously has consisted of a single species, is added *Frankenia triandra* Remy on the basis of the number of stamens. *Niederleinia juniperoides* Hieronymus is held to be distinct from *Frankenia microphylla* Cav. A variety, *angustifolia*, is added to *Hypericopsis persica*. A new species, *B. compacta*, is added to the genus *Beassonia*.—C. H. and W. K. Farr.

1494. VERDOORN, INEZ C. The Order Primulines (Myrsinaceae, Primulaceae, and Plumaginaceae), as represented in the Transvaal. South African Jour. Sci. 16: 365-735. 9 maps. 1920. An examination of all the material in the South African herbaria has established the fact that 11 species of the above order occur in the Transvaal.—E. P. Phillips.

1495. WEATHERBY, C. A. Habenaria pycodes, var. ecalcarata in Vermont. Rhodora 22: 31-32. 1920.—A description of a peculiar orchid collected by DR. ANNE E. PERKINS in a

meadow at Berkshire, Vermont, and later determined by PROFESSOR AMES as a peloric form of *Habenaria psycodes* which was described, figured, and named var. *ecalcarata* by Miss M. M. BRYAN in the Ann. Missouri Bot. Gard. 4: 38. 1917. The peculiarities of this form "(for it seems to be a teratological development rather than a true variety)", are an oblong-ovate, spurless petal in place of the usual three-parted, spurred and fringed lip; and the development of four anther sacs set at various angles in a rough semi-circle about its upper part, instead of the usual two nearly erect anther sacs. All of the flowers of the inflorescence were alike.—James P. Poole.

1496. WIEGAND, K. M. Variations in *Lactuca canadensis*. Rhodora 22: 9-11. 1920.—The writer has attempted a classification of the varieties and forms of *Lactuca canadensis* which seems to accord more with the material found in the field than does the treatment found in our various manuals. In floral and fruit characters *L. canadensis* is remarkably constant, and it is only in the leaves that great fluctuation is found. A short discussion of some of these variations is given, with a summary in the form of a key. Descriptions and bibliographies of the species and the forms recognized by the writer are given.—James P. Poole.

1497. WIEGAND, K. M. A new species of *Spergularia*. Rhodora 22: 15-16. 1920.—An account of the discovery of an apparent new species of *Spergularia*, which the author proposes as *S. alata* sp. nov. This species was collected at different times from 1916 to 1919 by different collectors, from the brackish soil about salt springs and salt ponds in central New York. A description is given as well as a comparison with the more closely related species. The attention of botanists is called to the plant in the hope that it may be found elsewhere.—James P. Poole.

1498. WILSON, E. H. Four new conifers from Korea. Jour. Arnold Arboretum 1: 186-190. 1920.—*Abies koreana*, *A. nephrolepis* f. *chlorocarpa* and *Larix dahurica* var. *Principis-Rupprechtii* f. *viridis* are described as new and a full description of *Thuja koraiensis* Nakai given.—Alfred Rehder.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

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SAM F. TRELEASE, *Assistant Editor*

1499. ANONYMOUS. A new kelp shredder catalogue. Pacific Fisherman 18: 56. 1920.

1500. ANONYMOUS. Making carbon from kelp. Pacific Fisherman 18: 64. 1920.—U. S. Government experimental kelp works at Summerland, California, believes that bleaching-carbon is a very valuable kelp product.—T. C. Frye.

1501. ANONYMOUS. [Abstract of: WILLIAMS, W. C. Observations on cases of seasonal hay fever diagnosed and treated with pollen extracts. Military Surgeon 46²: 199. 1920.] Jour. Trop. Med. & Hygiene 23: 206-207. 1920.—Report on cutaneous tests for sensitiveness to pollens from various plants. Of the 29 cases tested, 22 were sensitive to pollen from ragweed, and 5 to that from golden rod.—E. A. Bessey.

1502. ANONYMOUS. The organization of scientific work in India. Nature 105: 565-568. 1920.—Chiefly extracts from government of India's dispatch of June 4, 1919.—O. A. Stevens.

1503. ANONYMOUS. The cost of scientific publications. Nature 105: 285-286. 1920.—Urges government support for publications of scientific societies.—O. A. Stevens.

1504. ANONYMOUS. Symposium on the microscope. Nature 104: 545-546. 1920.—Relating to technique, manufacture, and research in metallurgy.—O. A. Stevens.

1505. ANONYMOUS. [Rev. of: LAUCKS, I. F. Commercial oils: vegetable and animal. With special reference to oriental oils. VIII + 138 p. Jno. Wiley and Sons: New York.

Chapman and Hall: London, 1919.] *Nature* 105: 132. 1920.—“Intended, not for the oil chemist, but those persons concerned in the oil industry who have no knowledge of chemistry, or at least as applied to oils. . . . short descriptions of the principal oils and fats met with in commerce . . . even the expert may peruse this part of the volume with advantage.”—*O. A. Stevens.*

1506. ANONYMOUS. **The organization of scientific work in India.** *Nature* 104: 653-654. 1920.

1507. ANONYMOUS. [Rev. of: PELLETT, FRANK C. **American honey plants together with those which are of special value to the beekeeper as sources of pollen.** 297 p., 155 illus. American Bee Journal, Hamilton, Illinois.] *Jour. Botany* 58: 156-157. 1920.

1508. BAILEY, E. M. **Food products and drugs, 1919.—Part II. Diabetic foods.** Connecticut [New Haven] Agric. Exp. Sta. Bull. 220: 261-342. 1920.—A discussion of what constitutes a diabetic food is given together with the analysis of 652 foods. These are analysis for water, ash, nitrogen, protein, fiber, starch, fat and other nitrogen-free extract which is had by difference.—*Henry Dorsey.*

1509. BEYTHIEN, A. **Trinkbranntwein aus Brennspritus.** [Brandy from lamp-alcohol.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel.* 39: 148-153. 1920.

1510. COULTER, J. M. **The evolution of botanical research.** *Nature* 104: 581-585. 1920.—Presidential address at St. Louis meeting of American Association for the Advancement of Science, Dec., 1919. The recent tendencies which seem to indicate future development are: (1) dealing with problems that are fundamental in connection with some important practise, (2) increasing realization that problems are synthetic, and (3) that structures are not static. There is no sharp division between pure and applied science. The investigator needs a broad training in order that he may be able to make use of the work of specialists in the various branches. Co-operation will play an important part; also experimental control in investigational work.—[See also next following Entry, 1511.]—*O. A. Stevens.*

1511. COULTER, J. M. **The evolution of botanical research.** *Science* 51: 1-8. Jan., 1920.—In this address certain evolutionary tendencies in the science of botany are pointed out. The phase of segregation among botanists has passed. One of the growing tendencies is to attack problems that are fundamental in connection with important practises, as, for example, the problems which underlie agriculture. Another tendency is increasing realization that botanical problems are synthetic. The morphologist, physiologist, ecologist, now realize that the facts possessed by one have a close relation to the successful work of the other. Still another tendency is the growing recognition of the fact that structures are not static. One must learn to distinguish between those structures that are relatively fixed and those that are variables. The conception of rigidity of structures is well illustrated by the early work of cytologists and that dealing with genetics. Experience has begun to enlarge the prospective of workers in these fields. It will be necessary for the successful botanists of the future to have a broader training than heretofore; to coöperate in research; to subject their work to rigid experimental control before conclusions are reached. [See also next preceding Entry, 1510.]—*A. H. Chivers.*

1512. DOWNES, H. **Herbarium pests.** *Jour. Botany* 58: 251-252. 1920.—A short account of a solution of naphthaline in petrol as a substitute for perchloride of mercury in poisoning herbarium specimens.—*K. M. Wiegand.*

1513. FRYE, T. C. **Notes on useful and harmful mosses.** *Bryologist* 23: 71. 1920.—Brief notes upon mosses that facilitate early decay of shingled roofs; that exterminate grass in lawns; that are used for packing vegetables.—*E. B. Chamberlain.*

1514. HARDY, G. H., A. B. RENDLE, B. D. JACKSON, AND C. S. MYERS. **The cost of scientific publications.** *Nature* 105: 353-354. 1920.—Four separate communications.

1515. HARTRIDGE, HAMILTON. **Microscopic illumination.** Jour. Quekett. Microsc. Club. Ser. 2. Vol. 14: 73-88. *Fig. 1-2.*—The subject is discussed under the following headings, (I) theoretical aspect of microscopic illumination, (II) position of critical illumination, (III) alternative methods of illumination, (IV) experimental comparison between different methods of illumination, (V) relative advantages of different methods, (VI) practical applications.—*Leva B. Walker.*

1516. HERDMAN, W. A., H. H. TURNER, E. B. KNOBEL, AND W. W. BRYANT. **The cost of scientific publications.** Nature 105: 326-327. 1920.—Four separate communications.

1517. HERZOG, R. O. **Über einige Fragen der Faserstoffschémie.** [On a few questions in the chemistry of fibres.] Naturwissenschaften 8: Heft 34. 673-681. 1920.

1518. HOLLAND, T. H. **The organization of scientific work in India.** Nature 105: 452-453. 1920.—A reply from the president of the Indian industrial commission to opinions expressed in previous numbers of Nature. Refers especially to botanical survey and forest botany.—*O. A. Stevens.*

1519. HOLMAN, R. M. **Contributions of Botany to Military Efficiency.** Proc. Indiana Acad. Sci. 1918: 49-55. 1920.—The author discusses some of the ways in which *Sphagnum*, Pathology and Forestry helped to solve difficult war problems.—*F. C. Anderson.*

1520. HOXIE, FREDERICK J. **Arrangement of heating pipes an important factor in decay of factory roofs.** Trans. Amer. Soc. Heat and Ventilating Eng. 25: 15-24. 12 fig. Jan., 1919. —Increasing the amount of heat near a roof may be resorted to instead of increasing the insulation to prevent the loss of heat and the consequent precipitation of moisture. The pipes are commonly placed beneath the windows of the sawteeth with the result that the warm moisture-laden air is circulated against the cooler windows and roof, and water thus precipitated upon the roof. The heating pipes should be placed near the roof to keep the planks warm and dry and prevent air circulation.—*Walter H. Snell.*

1521. KELLOG, V. **The United States national research council.** Nature 105: 332-333. 1920.—Brief statement of purpose and organization.—*O. A. Stevens.*

1522. MUIR, F. **Makiling [Luzon] as a biological station.** [Rev. of: MUIR, F. **The Derbidae of the Philippine Islands.** Philippine Journ. Sci. D, 12: 50-52. 1917.] Philippine Agric. 8: 17-18. 1919.

1523. NICHOLSON, W. A. **Oenanthe crocata L.** Jour. Botany 58: 201. 1920.—The question whether the juice becomes yellow when exposed to the air is discussed.—*K. M. Wiegand.*

1524. ROGERS, LEONARD. **Organization of scientific work.** Nature 105: 292. 1920.—An argument against centralized control.—*O. A. Stevens.*

1525. SAUVAGEAU, CAMILLE. **Utilization des algues marines.** [Utilization of marine algae.] Encyclopedie scientifique. 394 p. O. Doin: Paris, 1920.

1526. TRELEASE, SAM F., AND FORMAN T. MCLEAN. **Mount Makiling [Luzon] as a station for botanical research.** Philippine Agric. 8: 6-16. *Frontispiece and 5 pl.* 1919.

1527. TRELEASE, WILLIAM. **Botanical achievement.** Science 51: 121-131. 1920.—An address by the retiring President of the Botanical Society of America, at St. Louis, Dec. 31, 1919.—*A. H. Chivers.*



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1536. BREAKWELL, E. Native and introduced grasses at Mount George, Manning River. Agric. Gaz. New South Wales 31: 399-400. 1 fig. 1920.—The author reports on trials of native and introduced grasses. Coolah grass (*Panicum prolatum*) was especially drought resistant. It yielded about 8 tons dry fodder per acre. Native Australian millet (*Panicum decompositum*) was nearly as good as Coolah grass. *Phalaris bulbosa* proved the best winter grass, producing excellent feed through the cold months.—L. R. Waldron.

1537. BREAKWELL, E. Popular description of grasses. Agric. Gaz. New South Wales 31: 789-792. 2 fig. 1920.—Deals with 5 species of *Sporobolus*—*S. indicus*, *S. diander*, *S. virginicus*, *S. Lindleyi*, and *S. actinocladus*, all but *S. virginicus* being figured. These grasses are not economically important, either because of unpalatability or scarcity. None is cultivated.—L. R. Waldron.

1538. BURT, B. C., AND NIZAMUDDIN HAIDER. Cawnpore-American cotton: An account of experiments in its improvement by pure line selection and of field trials. 1913-1917. Agric. Res. Inst. Pusa, Bull. 88. 31 p., 10 pl. 1919.—Isolation of pure races was started in 1912. Plants were classified according to branching habit, hairiness of leaf, color of stamens, ginning percentage, length and fineness of lint, shape and size of boll, leaf shape, stem and foliage color. In later work the character of the root system was found to be an important factor. Attention was also given to the length of vegetative period prior to flowering, length of internodes, and the characteristics of secondary fruiting branches. In 1916 the number of selections had been reduced to 14, and these were divided into five groups according to the dates of maturity. Field tests were made and practical commercial valuations were secured on the ginned cotton during the seasons of 1915-1918 inclusive. The results indicate that selected strains of Cawnpore-American Cotton will yield as much as the *desi* cotton commonly grown and that it will bring a much better price, under proper marketing conditions. The Cawnpore-American Cotton must be sown early, with irrigation; *desi* cotton is best grown under similar conditions. The methods of sowing and culture are somewhat different for Cawnpore-American than for the *desi* cotton.—N. J. Giddings.

1539. CALVINO, MARIO. Quinientas toneladas de forraje fresco por hectárea mediante la Yerbe Elefante de Rhodesia. [Five hundred tons of fresh forage per hectare by means of the elephant grass of Rhodesia.] Rev. Agric. Com. y Trab. 3: 172-183. 14 fig. 1920.—The Napier or elephant grass (*Pennisetum purpureum* Schum.) was introduced into Cuba by the author in 1918. Its history and introduction into various countries is given. It may be propagated in various ways but most easily by cuttings. Best crops were secured by cutting at intervals of about forty days. Crops of about 60 tons (metric) per hectare were secured. Analyses showing the food value and the mineral constituents are given. The analyses of the fresh grass show the water content to be 24.5-38.2 per cent.—F. M. Blodgett.

1540. CLOUSTON, D., AND F. J. PLYMEN. Principal fodders in the central provinces and Berar, including the small bamboo (*Dendrocalamus strictus*). Agric. Jour. India 15: 380-385. 1920.—Egyptian clover (*Trifolium alexandrinum*) and the small bamboo (*Dendrocalamus strictus*) show promise for adoption on a large scale. *D. strictus* is especially valuable for light soils which cannot be irrigated. The yield (20 tons per acre) is large and the leaves contain four times as much protein as the common grasses while the proportion of indigestible fiber is greater in grasses. The seed may be used as feed and the mature culms serve many practical purposes.—F. M. Schertz.

1541. COCKERELL, T. D. A. Sugar-beet seed. Nature 104: 661. 1920.—Prior to 1909 all sugar-beet seed used in the U. S. A. was imported from Europe. The first attempt to grow seed in the U. S. A. was made in Montana in 1909 by Mr. Hans Mendleson, who continued his experiments on a small scale. When the supply of foreign seed was cut off by the war the industry had developed to such an extent that the United States was able to produce 5,211,000 pounds of seed in 1916 and 5,546,000 pounds in 1917.—O. A. Stevens.

1542. COLEBATCH, W. J. Roseworth Agricultural College harvest report 1919-1920. Jour. Dept. Agric. South Australia 23: 659-671, 738-753. 1920.—A report giving yields of grain crops, and results of variety tests of oats, wheat and barley grown under different methods of cultivation and with varying amounts of fertilizers. The data, in most cases arranged in tabular form, compare yield and rainfall in 1919 with those of a series of years.—*Anthony Berg.*

1543. EHRENBURG, PAUL. Versuch eines Beweises für die Anwendbarkeit der Wahrscheinlichkeitsrechnung bei Feldversuchen (zweiter Aufsatz). [Test of the applicability of the probable error calculation in field trials.] Landw. Versuchssta. 95: 157-294. 1920.—Presents data and further substantiates the value of the Gauss formula for calculating the probable error in determining the results of field trials.—*A. T. Wiancko.*

1544. FURBY, E. B. Top-dressing lucerne with superphosphate. Field experiments at Yanco. Agric. Gaz. New South Wales 31: 699-700. 1920.—Financial net gains of about \$36 and \$22 per acre resulted from the use of respectively 2 cwt. and 1 cwt. of superphosphate applied in the spring (September). One cwt. of superphosphate applied in the fall showed scarcely any gain, while 2 cwt. gave a profit of about \$18. Five check plots were cultivated but not manured. Two additional plots were neither cultivated nor manured. Eleven irrigations were made during the experiment.—*L. R. Waldron.*

1545. GERLACH. Die Entbitterung und Verwertung der Lupinen. [Removing the bitter principle and utilizing lupines.] Mitteil. Deutsch. Landw. Ges. 35: 619-620. 1920.—The author reviews some of the methods used to remove the bitter principle from lupine seed. He points out that the high cost of protein in Germany at this time may warrant the expense involved in utilizing the large amounts of protein in lupine seed for cattle feed and even as human food.—*A. J. Pieters.*

1546. HAMMOND, J. W. Green forage crops and corn for fattening lambs. Ohio Agric. Exp. Sta. Bull. 340. 45-99. 1920.—The first two experiments were designed to compare permanent bluegrass pasture with rape pasture or with a succession of the three annual crops—rye, clover, and rape; to secure data on the economy of feeding corn on pasture; and to compare the economy of raising lambs in pasture and in dry lot. The third experiment was intended to yield further data on the problems studied in the first two and in addition to compare a combination of rape and bluegrass pastures with either of the two pastures used alone, and to compare Shropshire × Merino with Merino lambs with respect to rate and economy of gains. The fourth experiment was designed to secure data regarding the economy of feeding a full feed and a half feed of corn to lambs on rape pasture and to compare Shropshire and Shropshire × Merino lambs with respect to rate, economy, and character of gains produced on rape pasture.—*R. C. Thomas.*

1547. HARRIS, E. Grading New South Wales wheats. The proposed standards. Agric. Gaz. New South Wales 31: 771-772. 1920.—The three classes are: (1) Australian Hard Red, (2) Australian Hard White, and (3) Australian White. Each class has five grades as follows: Premium A1, Premium B, and Nos. 1, 2, and 3. Respective minimum weights are: 65, 63, 60, 58, and 56 pounds per bushel; maximum moisture content ranges from 12.5 to 13.5 per cent and maximum percentage of damaged kernels from 2 to 7 per cent. Most of the Australian export wheat would come under No. 1 Australian White.—*L. R. Waldron.*

1548. HARRIS, FRANK S. The agronomist's part in the world's food supply. Jour. Amer. Soc. Agron. 12: 217-225. 1920.—Presidential address.—*F. M. Schertz.*

1549. HEINRICH, M. Aufgaben und Ziele der Samenkontrolle. [Problems and aims of seed-control.] Jahresber. Ver. Angew. Bot. 16: 116-123. 1918.

1550. HEINRICH, M. Beiträge über die Keimung bespelzter und nackter Timothyfrüchte. [Contributions regarding the germination of unhulled and naked timothy seeds.] Landw.

Versuchsst. 93: 258-276. 1919.—Germination tests of naked and covered, or beglumed, timothy seeds taken at random from the same samples showed that the former had a lower percentage germination than the latter, although the naked seeds are generally the largest and ripest. The difference seems to be due to the greater sensitiveness of naked seeds to unfavorable seed bed conditions. The naked seeds were more liable to mold. Exposure of the germinating seeds to light lessened the rate of germination of both kinds, but the final result was not appreciably affected in either case.—*A. T. Wiancho*.

1551. HOWE, H. E. *The search for cereals*. Sci. Amer. Monthly 1: 553-554. 1920.—A brief account of the collecting of cereals from foreign countries for the purpose of introducing new strains and varieties into North America.—*Chas. H. Otis*.

1552. HUTCHESON, T. B., AND T. K. WOLFE. *The effect of fertilizers on the germination of seeds*. Virginia Agric. Exp. Sta. Ann. Rept. 1918-1919: 33-37. 1920.—The experimental work consisted of tests in small flats on two different types of soils under greenhouse conditions. The injurious effect of fertilizers on germination varies with the kind of seed, the soil type, and the method of application. With few exceptions materials applied in the row in direct contact with the seed were more injurious than when applied broadcast and mixed with the soil before seeding.—*F. D. Fromme*.

1553. JEX, WALLACE. *Sugar and sugar products*. South African Jour. Indust. 3: 705-716. 1920.—The early history and development of the sugar industry in Natal is outlined, and an account given of the cultural methods and manufacturing processes employed.—*E. M. Doidge*.

1554. JOHNSON, E. C. *Twenty-ninth annual report*. Washington [State] Agric. Exp. Sta. Bull. 155. 57 p. 1920.—Contains brief summary reports of experimental work by the Division Heads, among which are the following: The value of pea straw as a roughage for lambs, for wintering pregnant ewes, and for ewes suckling lambs; forage crops for pork production; a comparison of different inoculating cultures and factors that control the infection of legumes by bacteria; seed analysis; spraying for weeds; influence of cultivation of soil on nitrogen composition of wheat; a comparison of corn, artichoke, and sunflower silage as feeds for milk production; sweet clover for pasture for dairy cows; "sour milk" silage; field crop varieties; value of a nurse crop; cultivation and rate of seeding wheat; inheritance of varietal characters; crop rotations; orchard pollination; Mendel's law in blackberry and raspberry hybrids; apple rosette; orchard cover crops; renovation of prune orchards; apple storage; fruit evaporation and by-products; wheat smut, the rhizoctonia disease, plant disease survey; oat smut; the nitrogen supply in semi-arid soils; and soil moisture studies.—*F. D. Heald*.

1555. KELLY, H. J. *Planting Sudan grass*. Agric. Gaz. New South Wales 31: 719-720. 1 fig. 1920.—Brief notes are given on general culture, time of planting, and quantity of seed to sow.—*L. R. Waldron*.

1556. KERLE, W. D. *Farmers' experiment plots*. Potato experiments, 1919-20. Upper north coast district. Agric. Gaz. New South Wales 31: 781-788. 2 fig. 1920.—Variety and manurial experiments were conducted in conjunction with farmers. The outstanding feature of the experiments was the greatly increased yields brought about by the use of phosphorus, the maximum net increase in market value of crop from five stations averaging over \$200 per acre.—*L. R. Waldron*.

1557. LEHKUM, P. *Ueber ein neues Verfahren zum Abkeimen der Kartoffeln*. [A new process for removing sprouts from potatoes.] Mitteil. Deutsch. Landw. Ges. 35: 587. 1920.—Brief note referring to work done by Schribaux (citation not given). The process consists in immersing sprouting potatoes in weak sulphuric acid.—*A. J. Pieters*.

1558. LINDNER, P. *Unser Getreide als Fettquelle und die Bedeutung der Aleuronschicht für das Getreidekorn*. [Our cereals as a source of fats and the significance of the aleurone

layer to the seed.] *Jahresber. Ver. Angew. Bot.* 16: 29-31. 1918.—There is nine times as much fat in the aleurone layer as in the germ; consequently about a million tons of fat from the grain harvest go into the bran each year. This was formerly fed to cattle but during the war was used in bread. Although cattle digest this fat, it passes unchanged through the human alimentary tract. If, however, the cell walls of the aleurone layer are first dissolved by acid, the fat becomes digestible for man.—This fat is deposited in the aleurone layer and hulls of the grain to prevent water from penetrating to the interior.—*P. J. Anderson.*

1559. MCKAY, M. B. Uniform rules and regulations for seed potato certification in the Pacific Coast states. *Monthly Bull. California State Commission Hort.* 8: 288-291. 1919.

1560. MAIDEN, J. H. Chats about the prickly pear. No. 6. *Agric. Gaz. New South Wales* 31: 645-648. 1920.—Summarizes certain bulletins dealing with prickly pear as stock food in the U. S. A.—*L. R. Waldron.*

1561. MAKIN, R. N. Farmers' experiment plots. Maize experiments, 1919-20. South coast district. *Agric. Gaz. New South Wales* 31: 795-797. 1920.—Variety and manurial experiments were conducted in conjunction with farmers. Several varieties of maize from the U. S. A. gave promising results.—*L. R. Waldron.*

1562. MAKIN, R. N. Lucerne on the coast. The south coast. *Agric. Gaz. New South Wales* 31: 384-385. 1920.—In selecting a site for lucerne, the nature of the subsoil should be determined to the depth of four feet. In preparing for alfalfa care should be taken to destroy the weeds, as many lucerne failures are due to foul land. Deep plowing and too fine a tilth are inadvisable as the soil has a tendency to puddle and choke the seedlings. Sowings should be made from March to June at the rate of 12 to 16 pounds per acre. When plants have developed the third pair of leaves it should be possible to control weeds and conserve moisture by harrowing without damaging the lucerne. A top dressing of 2 cwt. superphosphate once a year and harrowing after each cutting are recommended.—*L. R. Waldron.*

1563. MEEK, B. C. Trials with peas. *Agric. Gaz. New South Wales* 31: 397-398. 1920.—In a test with varieties of garden peas Yorkshire Hero outyielded all others. Local seed (variety not stated) outyielded introduced seed. Superphosphate was the best fertilizer.—*L. R. Waldron.*

1564. MENDES, F. C. CORREA. Relatório de alguns serviços mais importantes a cargo da direcção dos serviços agrícolas e florestais. [Report of director of agricultural and forestry service.] *Bol. Agric. Nova Goa* [Portuguese East India] 1: 97-109. 1919.—A report of the more important undertakings of the Department of Agriculture and Forestry of Portuguese East India for the period Jan.-Apr., 1919.—*J. A. Stevenson.*

1565. MÜNTER, F. Pflanzenanalyse und Düngung. [Plant analysis and fertilizers.] *Jour. Landw.* 68: 207-224. 1920.—The results of experiments on Lauchstedt loessal soil. Nitrogen and phosphoric acid fertilizers lowered the sulphuric acid content of barley straw, while lime and magnesia were not materially influenced by nitrogen, potassium, or phosphoric acid fertilizers. Meteorological conditions of the single year exert so great an influence on the growth of barley that the fertilizer requirement of the soil cannot be deduced with certainty from the percentage of nitrogen, potassium, and phosphoric acid. The nitrogen content of barley straw was decreased slightly by potassium, more strongly by phosphoric acid. A straw harvest from 1 hectare containing less than 9 kgm. nitrogen indicates a lack of nitrogen in the soil. The barley plant is not suitable for such experimentation; the proportions of nitrogen to potassium or phosphoric acid give no reliable indication as to the fertilizer status of a soil. Sugar beets are better for this purpose. The production of beet roots in a good growing year was influenced by nitrogen, under poor conditions by phosphoric acid, less by potassium. Beet leaf production depends largely on the nitrogenous fertilizers. The lime and magnesia content of the sugar beet roots was affected only moderately by the

use of fertilizer. Potassium fertilizer, however, increased, while phosphoric acid decreased, the lime and magnesia content in the tops. Nitrogen gave variable results. Less than 50 kgm. nitrogen in tops, or 100 kgm. in roots, from 1 hectare denotes lack of nitrogen. Since potassium influences production less, a definite amount taken up by the plant per hectare cannot be given. Less than 14 kgm. phosphoric acid in the roots per hectare indicates a lack of this nutrient, but for the leaves no definite figure is evident. Meteorological conditions so influence the growth of beets that the nitrogen and potassium content does not lead to definite conclusions concerning fertilizer requirements of the soil. For P_2O_5 content the limit of 0.18 per cent in the roots and 0.40 per cent in the leaves can be set. For proof of the fertilizer needs of a soil 2 different plots should be laid out, one fertilized with nitrogen, the other with phosphoric acid and potassium. Conclusions may be drawn according to the following rule: The soil is lacking in potash when in the tops the percentage of potash is less than that of nitrogen. Phosphoric acid is lacking when the ratio $N:P_2O_5$ from the nitrogen plot is greater than 5. Nitrogen is lacking when from the $P_2O_5 + K_2O$ plot the ratio is less than 100:35. The following conclusions were even more reliable: Potash is lacking when it is less than 60 per cent of the nitrogen from the nitrogen-fertilized plot, and phosphoric acid is lacking when P_2O_5 is less than 40 per cent of the nitrogen.—*C. E. Leighty.*

1566. NIELSEN, H. B. **Potato certification in California.** Monthly Bull. California State Commission Hort. 8: 285-287. 1919.

1567. PFEIFFER, T. **Die Bedeutung der sogenannten Schutzstreifen bei Feldversuchen und die Wahrscheinlichkeitsrechnung.** [The significance of the so-called protection strips in field trials and the probability calculation.] Fühlings Landw. Zeitg. 68: 412-419. 1919.—A criticism of the conclusions of Schneidewind and his associates regarding the use of unplanted and untreated strips between test plots in field experiments, in which it is stated that plots with unplanted division strips show too high yields, that in consequence the effects of manurial treatments are minimized and that by keeping the fertilizer distribution within the outside drill rows of the plot there would be no noticeable effect upon neighboring plots and interspaces might better be omitted. It is shown that plants draw nourishment from the unplanted division strips, that adjoining and differently treated plots do affect each other, and that in field trials involving comparisons of different treatments division spaces should be used but that these should not be left unplanted. It is also held that the probable error calculation can be used to good advantage and should always be employed.—*A. T. Wiancko.*

1568. PITT, J. M. **Lucerne on the coast. The central coastal districts.** Agric. Gaz. New South Wales 31: 381-384. 1920.—It is claimed that the alluvial soils bordering the rivers in this region are admirably suited to alfalfa. The Hunter River has long been famed for its enormous output of hay and seed of the Hunter River strain. Formerly, stands 12-20 years old were not uncommon, but now the profitable life averages from 4 to 7 years. This is attributed to various causes, such as inferior seed, decrease of humus, sowing at wrong season, poor preparation, cutting too often and grazing too closely. Cultural instructions are given in detail. Autumn seeding at the rate of 15-20 pounds per acre has proved most satisfactory. Instructions are also given on cutting, curing, and grazing. Top dressing with 2 cwt. of superphosphate applied in the early spring and harrowed in has proved very beneficial.—*L. R. Waldron.*

1569. RAO, U. VITTAL. **Habit in sugar canes.** Agric. Jour. India 15: 418-424. 1920.—A report on the straightness of sugar canes as revealed by pot experiments, station records, and as influenced by suitable crossing. Straight canes are preferred by factories and by cultivators, partly because lodged canes contain less cane sugar and more glucose.—*F. M. Schertz.*

1570. REYNOLDS, B. A. **Sterilize the fencerow and reduce next year's losses.** Monthly Bull. Dept. Agric. California 8: 595-599. 1919.

1571. ROBINSON, W. L. **The use of forage crops in the fattening of pigs.** Ohio Agric. Exp. Sta. Bull. 342. 169-222. 1920.—Reports on experiments conducted for the purpose of securing more information regarding the influence of the various kinds of forage, of the methods of feeding, and of the character and amount of the concentrates on the economy of production. Comparisons were made of full and limited rations of concentrates with and without a nitrogenous supplement, of self and hand feeding, and of different forage crops and forage crop combinations. The work is presented with the view of enabling the farmer to determine with some degree of accuracy the methods which under given conditions will bring returns approaching the maximum from both the pigs and the land used in growing the forage.—*R. C. Thomas.*

1572. ROWNEY, L. F. **Trials of grasses and fodder plants.** Glen Innes experiment farm. Agric. Gaz. New South Wales 31: 799-803. 1920.—The following grasses were under trial: *Andropogon intermedius* (native), *A. affinis* (native), *Bromus japonicus*, *Festuca arundinacea*, *Schedonorus Hookerianus* (native), *Danthonia semiannularis* (native), *Dactylis glomerata*, *Phalaris bulbosa*, *Lolium perenne*, *Deyeuxia coarctata*, *Avena elatior* [*Arrhenatherum elatius*], and *Phleum pratense*. Best results seemed to be obtained from *Bromus*, *Phalaris*, *Lolium*, and *Avena*.—Among several alfalfas (lucerne), "Montana" seemed to give best results. Alfalfa seed does not set at this station.—Satisfactory results were secured from *Melilotus alba*, *Trifolium pratense perenne* and *Poterium sanguisorba*.—*L. R. Waldron.*

1573. RUMKER, K. V., UND R. LEIDNER. **Die Sortenanbauversuche im Jahre 1918.** [Variety tests in 1918.] Landw. Jahrb. 35: 327-340. 1919.—A report on variety tests with oats, barley, wheat, soy beans, bush beans, and millet.—*A. J. Pieters.*

1574. SAILLARD, ÉMILE. **La betterave à sucre pendant la guerre.** [Sugar beets during the war.] Compt. Rend. Acad. Sci. Paris 170: 1460-1461. 1920.—A study of analyses of sugar beets as affected by meteorological and other conditions in France during 20 years. The amount of sugar per acre, as shown by analyses during October of each year, increased until in 1919 it reached 17.57 per cent. The difference is held to be due to the scarcity of fertilizers, especially nitrogenous, during the war.—*C. H. Farr.*

1575. SCHMIDT, H. **Anforderungen der Landwirtschaft an die Botanik.** [Demands of agriculture on botany.] Jahresber. Ver. Angew. Bot. 16: 31-37. 1918.

1576. SCHNEIDEWIND, W. **Parzellengrößen-Versuche.** Untersuchungen über die Brauchbarkeit verschieden grosser und verschieden angelegter Parzellen bei Düngungsversuchen und die Wahrscheinlichkeitsrechnung. [Plot experiments. Investigations concerning the usefulness of plots of varying size and laid out in various ways in fertilizer experiments and the calculation of probabilities.] Arbeit. Deutsch. Landw. Ges. 296. 6-51. 1919.—The author reports the results of five years' work, undertaken to determine the relative accuracy of results with plots varying in size from 9 and 100 square meters to 200 square meters. Of the 9 square meter plots there were two series, one with uncultivated strips 80 cm. wide surrounding each plot, the other with plots adjoining one another. The fertilizers used were sodium nitrate and calcium-ammonium nitrate. The author concludes: (1) Plots with uncultivated intervening spaces are unreliable, the yields being too high and the effect of the fertilizers too little noticeable. (2) The plots when adjoining, irrespective of size, gave corresponding yields. (3) When the fertilizer is so distributed as to be placed within the outer three drill rows, its effect is not apparent in the adjoining plot. (4) The differences between minimum and maximum yields was greatest in the 9 square meter plots, due largely, however, to the fact that the number of small plots was larger than that of the large plots. (5) The probability calculations showed that where considerable yield differences occurred these were a true measure of the effect of the fertilizer. Where small increases are secured the results are uncertain.—*A. J. Pieters.*

1577. SHEPHERD, A. N. **Farmers' experiment plots. Lucerne top-dressing trials, 1919-20. Murrumbidgee irrigation areas.** Agric. Gaz. New South Wales 31: 609-616. 3 fig. 1920.—Results indicate that lucerne responds profitably to increased care in culture. Profits resulted from using superphosphate as a top dressing.—*L. R. Waldron.*

1578. SLATE, WILLIAM L. JR., AND BENJAMIN A. BROWN. **Fertilizers for potatoes.** Storrs [Connecticut] Agric. Exp. Sta. Bull. 106. 39-48. 1920.—During 4 years (1915-1918) varying amounts of potash, phosphoric acid, and ammonia have been applied to potatoes. As much as 80 pounds of potash per acre has given profitable increases in yield. Manuring the land the previous year has not reduced the need of potash. It appears that 100-120 pounds of phosphoric acid per acre are sufficient. Fields not recently manured need 100 pounds of ammonia per acre; this may be reduced where manure has been used recently.—*Henry Dorsey.*

1579. SPAFFORD, W. J. **Agricultural experiments—linseed for seed.** Jour. Dept. Agric. South Australia 23: 754-756. 1920.

1580. SPAFFORD, W. J. **Experimental farms harvest reports, Turretfield.** Jour. Dept. Agric. South Australia 23: 13-29. 1920.—A report of the 1919 harvest with statistical data comparing the grain and forage crops with the rainfall during a series of years. The results of wheat varieties in fertilizer, rotation, and cultural tests are similarly compared.—*Anthony Berg.*

1581. SPAFFORD, W. J., AND E. A. BRISTOW. **Experimental farm harvest reports, Boobrowie.** Jour. Dept. Agric. South Australia 23: 907-914, 1020-1030. 1920.—Yield report of grain crops from variety, cultural, and fertilizer experimental tests. The data in most cases are given in statistical form, comparing yields and the rainfall through a series of years.—*Anthony Berg.*

1582. SPAFFORD, W. J. **Agricultural experiments.—Report for year 1919-20.** Jour. Dept. Agric. South Australia 23: 593-602. 1920.—The results of experiments conducted at Hammond, Butler, Wilkawatt, and Yelanna, and dealing with cultivation methods relating to dry farming, including wheat variety trials, rotation, and fertilizer tests.—*Anthony Berg.*

1583. SPRAGG, FRANK A. **The spread of Rosen rye.** Jour. Heredity 11: 42-44. 1 fig. 1920.—A brief account of the spread of Rosen rye, as shown by the number of bushels from Michigan sold to the various states for seed.—*J. H. Beaumont.*

1584. TAYLOR, E. P. **Uniformity of rules and regulations of potato seed certification.** Monthly Bull. California State Commission Hort. 8: 280-285. 1919.

1585. THOMS, HERMANN. **Über Lupinenverwertung. [Utilization of lupines.] Jahresber. Ver. Angew. Bot. 16: 33-60. 1918.**

1586. THORNE, C. E. **Palatable sirup from sugar beets.** Monthly Bull. Ohio Agric. Exp. Sta. 5: 294. 1920.

1587. TROWBRIDGE, P. F. **Report of Langdon Substation, 1914 to 1919.** North Dakota Agric. Exp. Sta. Bull. 134. 31 p., 8 fig. 1920.—The data presented were secured by E. D. STEWART, superintendent of the substation until his death. Wheat after corn and wheat after clean fallow yielded the same. The corn crop was not generally successful.—In fertilizer studies, barnyard manure alone and with minerals increased wheat yields from 2.4 to 4.6 bushels per acre over the check yield of 20.5. Green manure (field peas) used with minerals was less successful.—Yields of grain were larger upon the deeply plowed plats.—Sunflowers outyielded maize 710 pounds per acre, or 27 per cent, in air-dry material. Slender wheat-grass, *Agropyron tenerum*, was found valuable for alkali land.—Upon the average, for 11 years, Kubanka durum has outyielded all other varieties of wheat. Yields of varieties of oats, barley, and potatoes are given.—*L. R. Waldron.*

1588. WELLINGTON, R. **The uselessness of hill selection under conditions where rapid degeneration or "running out" is prevalent.** *Proc. Amer. Soc. Hort. Sci.* 16: 175-179 (1919) 1920. —Work over a series of years on hill selection of potatoes showed conclusively that the practice is useless in fields where degeneracy is prevalent. Degeneracy occurred in the progeny of both high and low yielding hills. Low yielding hills often produced better than high yielding ones. In 1916, 17 out of 23 varieties gave an increased yield in favor of the low yielding hills. Transfer of degenerating strains for a year to localities farther north seems to increase the vigor of the strain.—*H. A. Jones.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

NEIL E. STEVENS, *Editor*

1589. ADAMS, HENRY. **The degradation of the democratic dogma.** 317 p. The Macmillan Co.: New York, 1919.—The introduction by BROOKS ADAMS details some of the activities of JOHN QUINCY ADAMS in behalf of science. Among these are some of botanical interest, notably his project (p. 53) to preserve a forest of live-oak near Pensacola in order that the species might be studied.—*Neil E. Stevens.*

1590. ANONYMOUS. **Cotton growing.** *Nature* 105: 793. 1920.—A note on the "future organization" of the Empire Cotton Growing Committee of the Board of Trade, which proposes to support both research and the training of men in pure science, in which it hopes to secure the co-operation of all the plant-using industries.—*O. A. Stevens.*

1591. ANONYMOUS. **International Catalog of Scientific Literature. M. Botany. Fourteenth annual issue.** 753 p. London, 1919.—Literature received between September, 1914, and May, 1916. "The primary divisions adopted correspond to the recognized branches of the science of botany." "It is considered essential that all work on fossil plants should appear in the botany scheme." The primary divisions in the schedule of classification for Botany are: general; morphology, embryology and cytology; physiology; pathology; evolution; taxonomy; geographic distribution.—Author index, 259 pages; subject index, 439 pages.—*D. Reddick.*

1592. ANONYMOUS. **Mary Sophie Young.** *Bot. Soc. Amer. Misc. Publ.* 76. 81-82. 1920.—An appreciation of the life and work of the late Dr. Young of the University of Texas.—*J. R. Schramm.*

1593. ANONYMOUS. **William Gilson Farlow.** *Bot. Soc. Amer. Misc. Publ.* 76. 79-80. 1920.—An appreciation of the life and work of the late Professor Farlow, of Harvard University.—*J. R. Schramm.*

1594. BRITTEN, J. **Some early Cape botanists and collectors.** *Jour. Linn. Soc. London Bot.* 45: 29-51. *Pl.* 4. 1920.—A consideration of the following botanists and collectors of Cape Colony whose work is represented in the Department of Botany of the British Museum: JUSTUS HEURNIUS; PAUL HERMANN; THOMAS BARTHOLINUS; HENRICUS BERNARDUS OLDENLANDIUS; JOHN STARRENBURGH; JOHN FOXE; FRANZ KIGGELAER; Monsieur DES MARETS; FRANZ PEHR OLDENBURG; ANDREAS AUGE; FRANCIS MASSON; CARL PEHR THUNBERG; JAMES NIVEN; WILLIAM PATERSON; ANTON PANTALEON HOVE; WILLIAM ROXBURGH; JAMES WILES; JAMES LIND; JAMES ROBERTSON; DAVID NELSON; ROBERT BROWN; BANKS; and SOLANDER. A portrait of Masson is included.—*A. J. Eames.*

1595. FAIRCHILD, D. **The dramatic careers of two plantsmen.** *Monthly Bull. Dept. Agric. California* 8: 585-589. 1919.—FRANK N. MEYER and AARON AARONSOHN.—*E. L. Overholser.*

1596. HARVEY-GIBSON, R. J. **Outlines of the history of botany.** 274 p. A. & C. Black, Ltd.: London, 1919.—A course of lectures for students at the University of Liverpool.—*H. L. Shantz.*

1597. JONES, L. R. **Our journal, Phytopathology.** *Phytopath.* 9: 159-164. 1919.—A record of the American Phytopathological Society to the celebration of its tenth anniversary.—*J. G. Dickson.*

1598. L [ACAITA], C. C. [Rev. of: SARGEANT, JOHN. **The trees, shrubs, and plants of Virgil.** vii + 149 p. B. H. Blackwell: Oxford (1920).] *Jour. Botany* 58: 253-256. 1920.

1599. LAUPERT. **Die Gründung einer Gesellschaft zur Förderung des Zuckerrübenbaues und der Zuckerindustrie in Lettland.** [The establishment of an association for encouraging sugarbeet culture and the sugar industry in Lettland.] *Mitteil. Deutsch. Landw. Ges.* 35: 603-605. 1920.—A report of the organization of this society presented on behalf of F. HÖLTZ-ERMANN.—*A. J. Pieters.*

1600. LYMAN, G. R. **The advisory board of American Plant Pathologists.** *Phytopath.* 9: 202-206. 1919.

1601. MERRILL, GEORGE P. **Contributions to a history of American state geological and natural history surveys.** U. S. Nation. Mus. Bull. 109. 550 p., 37 pl. 1920.—This work contains incidental references to prominent botanists who were associated with the surveys. As these are not mentioned in the index the page numbers are included here following the names: J. C. ARTHUR 249, E. E. BALDWIN 208, W. J. BEAL 226, N. L. BRITTON 319, W. M. CANBY 539, J. M. COULTER 81, F. V. COVILLE 21, M. A. CURTIS 370, 374, CHESTER DEWEY 155, AMOS EATON 327, GEORGE B. EMERSON 155, GEORGE L. GOODALE 135, LEO LESQUEREUX 15, 59, 75, 82, 451, CHARLES MOHR 11, J. S. NEWBERRY 35, 69, 319, 531, C. S. RAFINESQUE 101, 102, C. S. SARGENT 539, JOHN TORREY 329.—*Neil E. Stevens.*

1602. RAMSBOTTOM, J. **James William Helenus Trail. (1851-1919.)** *Trans. British Mycol. Soc.* 6: 297-298. 1920.—Professor Trail was professor of botany at Aberdeen, Scotland, and published numerous papers on systematic mycology.—*W. B. McDougall.*

1603. ROBERTS, HERBERT F. **The founders of the art of breeding.** *Jour. Heredity* 10: 229-239, 257-270. 1 fig. 1919.—Carl Friederich von Gärtner, John Goss, William Herbert, Thomas Andrew Knight, Alexander Seton, and A. F. Wiegmann, Charles Darwin, Wilhelm Olbers Focke, Duchartre, D. A. Godron, Henri Lecoq, Charles Naudin, Augustin Sageret, B. Verlot, Henri de Vilmorin, Max Wichura. [See also Bot. Absts. 5, Entry 90, 91.]—*M. J. Dorsey.*

1604. SHEAR, C. L. **First decade of the American Phytopathological Society.** *Phytopath.* 9: 165-170. 1919.—A sketch of the Society containing excerpts from the secretary's minutes, committee reports, and letters.—*J. G. Dickson.*

1605. STEVENS, F. L., L. H. PAMMEL, AND MEL T. COOK. **Byron David Halsted. June 7, 1852-August 28, 1918.** *Amer. Jour. Bot.* 7: 305-317. *Portrait.* 1920.—A brief biography of Professor Halsted, to which is appended a list of his publications, 411 in number.—*E. W. Sinnott.*

1606. TILDEN, JOSEPHINE E. **Bibliography of the literature relating to the Pacific Ocean algae and to the freshwater algae of the countries bordering upon the Pacific Ocean.** 58 p. (Separately printed) 1920.—A reprint in pamphlet form from *Index Algarum Universalis: A universal card index of the marine, freshwater, epiphytic, and parasitic algae of the world.* A supplement includes special bibliographies relating to fisheries, economic algae, geology, and fertilizer algae; and it is noted that the bibliographies relating to diatomaceous earth and to fossil algae are too large for reprinting.—*C. E. Allen.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ALFRED GUNDERSEN, *Assistant Editor*

1607. ANONYMOUS. *Toronto botanic garden*. Brooklyn Bot. Gard. Rec. 9: 127. 1920.—News item of plans being developed for the establishment of a botanic garden in Toronto, Canada, by the University of Toronto in cooperation with the municipal authorities and the Provincial Government.—*C. S. Gager*.

1608. BOWER, F. O. *Botany of the living plant*. 580 p., 447 fig. \$10.00. Macmillan & Co., Ltd.: London, 1919.—Expansion of course in elementary botany in Glasgow University. Elementary and fundamental held as equivalent terms. Plant presented as living, growing, self-nourishing, self adapting creature. Angiosperms 300 pages, seed, cells, tissues, leaf, root, water-relation, nutrition, etc., followed by gymnosperms and lower plants. General conclusion: Sex and heredity, alternation of generations and the land-habit. Appendix: A. Floral construction in angiosperms; B. Vegetable food-stuffs.—*A. Gundersen*.

1609. CLUTE, WILLARD N. *Plant names and their meanings*. Amer. Bot. 26: 116–124. 1920.

1610. GAGER, C. STUART. *Heredity and evolution in plants*. xv + 265 p., 112 fig. P. Blakiston's Son & Co.: Philadelphia, 1920.—In text-book form. Thirteen chapters: life history of fern (2), fundamental principles, heredity, experimental study of heredity, evolution, Darwinism, experimental evolution, the evolution of plants (2), geographical distribution, paleobotany. Bibliography.—*C. S. Gager*.

CYTOLOGY

GILBERT M. SMITH, *Editor*GEO. S. BRYAN, *Assistant Editor*

1611. ANONYMOUS. *Carriers of the germ plasm*. Jour. Heredity 10: 422. Fig. 21. 1919.

1612. GUILLIERMOND, A. *Sur la structure de la cellule vegetale*. [On the structure of the vegetable cell.] Compt. Rend. Acad. Sci. Paris 170: 1515–1518. 1920.—Cytological methods show that all cells contain mitochondria; while studies on living cells show they are not artifacts; but these studies cannot be expected to contribute much as to their nature. The author applies term chondriosome to plastid forming bodies, while DANGEARD considers vacuolar systems chondriosomes.—*C. H. Farr*.

1613. HARTRIDGE, H. *Economical dehydrating and clearing agents*. Jour. Physiol. [London] 54^{1, 2}: viii–ix. 1920.—Amyl alcohol used in place of absolute alcohol and clove oil following 95 per cent alcohol and followed by Canada balsam in xylol; also for passing to No. 1 petrol for embedding in paraffin. No. 1 petrol used successfully in place of xylol for paraffin imbedding and dissolving paraffin from mounted sections.—*Ernest Shaw Reynolds*.

1614. LICENT, E. *Sur l'emploi, comme fixateur, des mélanges de formol et de composés chromiques*. [The use of mixtures of formalin and chromic compounds as fixatives.] Compt. Rend. Acad. Sci. Paris 170: 1518–1521. 1920.—For the past 15 years the writer has used successfully the following formulae: (1) 1 per cent chromic acid 80 cc.; commercial formalin 15 cc.; glacial acetic acid 5 cc. (2) the same as (1) but using 2 per cent chromic acid. (3) 2 per cent chromic acid 6 cc.; commercial formalin 30 cc.; crystallizable acetic acid 5 cc. (4) 2 per cent chromic acid 50 cc.; commercial formalin 30 cc.; crystallizable acetic acid a few drops; 10 per cent potassium bichromate 10 cc.; 10 per cent nickel acetate 10 cc. (5) Same as (4) with the addition of 10 cc. of saturated aqueous solution of mercuric chloride. Formulae

1 and 2 are used in young tissues, meristem, and ordinary adult tissue; 3 is used on resistant tissues; and 4 and 5 for mitochondria. The formalin is usually added just before using. Material may be left permanently in the fixative after adding a little water.—C. H. Farr.

1615. MANGENOT, G. A propos du chondriome des *Vaucheria*. [The chondriome of *Vaucheria*.] *Compt. Rend. Acad. Sci. Paris* 170: 1458–1459. 1920.—In living material granules of various sizes are found among the chloroplasts, bodies that reach the size of chloroplasts and smaller motile bodies consisting of lipoids. In addition there are round grains, of a dead appearance, mingled with short rods (the true mitochondria) that are always larger than the fat bodies. Metachromatic corpuscles may also be distinguished by intra-vital stains.—C. H. Farr.

1616. MANGENOT, G. Sur l'évolution des chromatophores et le chondriome chez les Floridees. [The development of the chromatophores and chondriomes of the Florideae.] *Compt. Rend. Acad. Sci. Paris* 170: 1595–1598. *Fig. 1–11*. 1920.—In the Lemnaceae the rhodoplasts are elongated, the smaller ones resembling chondriocents, but containing the pigment material. These small rhodoplasts are found in the carpogonium, but after fertilization they fragment into chondrisomal structures which persist until the formation of the young carpospores, when they enlarge and the pigment reappears in the mature spore. Another type of chondriosome remains unchanged throughout the life history of the alga.—C. H. Farr.

1617. SHARP, LESTER W. Somatic chromosomes in *Tradescantia*. *Amer. Jour. Bot.* 7: 341–354. 2 pl. 1920.—Somatic chromosomes from the root tip of *Tradescantia virginiana* were studied. The entire cycle of chromatin history is described in detail, beginning with the metaphase. The author is particularly concerned with the time and method of chromosome splitting and with the bearing of the observed facts on the problem of chromosome reduction. During telophase the chromosomes are transformed by irregular vacuolation into alveolar-reticulate structures, and in the resting reticulum the limits of the constituent chromosomes may sometimes still be made out. In prophase, the chromosomes separate from one another and each gives rise to a single slender chromatic thread in which the definitive split develops as a new formation. This splitting has no relation to the vacuolation during telophase, at which time the chromosomes must be regarded as single. Contrary to the conclusions of some previous workers, therefore, splitting is a phenomenon of the prophase rather than of the telophase. No evidence has been found that chromosome splitting is a division of smaller chromatic units. Chromosome behavior during somatic telophase does not provide a key to the interpretation of the reduction process.—E. W. Sinnott.

FORESTRY AND FOREST BOTANY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

1618. [ANONYMOUS.] A. B. J. Australian hardwoods. [Rev. of: BAKER, R. T. *The hardwoods of Australia and their economics*. xvi + 522 p., 1 pl. Technical Education Series No. 23. The Technological Museum: Sydney, 1919.] *Nature* 105: 802–803. 1920.—Australia has probably the largest variety of hardwoods in the world, but representing less than 500 species. Nearly half of these belong to *Eucalyptus*, which supplies the bulk of hardwoods for commercial purposes. Author emphasizes use of color in identification. Reviewer has compared some of the plates with specimens and finds the representation good.—O. A. Stevens.

1619. ANONYMOUS. Awbury Arboretum. *Brooklyn Bot. Gard. Rec.* 9: 23–24. 1920.—Digest of article in *Bull. Geog. Soc. Philadelphia* (July, 1919).—See Bot. Absts. 7, Entry 77.

1620. ANONYMOUS. **The British Empire forestry conference.** *Nature* 105: 759-760. 1920.—Commission organized Nov. 1919, met in London July 7-22. Proposal to organize an Imperial Forestry Bureau to act as a clearing house of information; to establish a research institute to deal with cultural problems and another for utilization problems. Conference held that an institution for training forest officers should be established.—O. A. Stevens.

1621. ANONYMOUS. **Gymnospermic history.** [Rev. of: SEWARD, A. C. **Fossil Plants: A text-book for students of botany and geology.** Vol. 4, Ginkgoales, Coniferales, Gnetales. xvi + 543 p. University Press: Cambridge, 1919.] *Nature* 105: 97-98. 1920.—See Bot. Absts. 7, Entries 379, 383.

1622. ANONYMOUS. **Oil, sugar and alcohol from an African tree.** *Sci. Amer.* 123: 175. 1920.—A brief note concerning the sump tree, *Balanites aegyptiae* Del.—Chas. H. Otis.

1623. ANONYMOUS. **State to grow nursery trees.** *Amer. Nurseryman* 32⁶: 120. 1920.—The Pennsylvania department of forestry plans to grow several thousand young forest trees in nurseries at various state institutions. After the trees are 3 years old they will be planted by private interests and by the department of forestry.—J. H. Gourley.

1624. BERRY, E. W. **The ancestors of the sequoias.** *Sci. Amer. Monthly* 2: 207-208. 1920.—See Bot. Absts. 7, Entry 385.

1625. BERTRAND, GABRIEL. **Des conditions qui peuvent modifier l'activité de la chloropirine vis-à-vis des plantes supérieures.** [The conditions which frequently modify the effect of chloropirine upon the higher plants.] *Compt. Rend Acad. Sci. Paris* 170: 952-954. 1920.—See Bot. Absts. 7, Entry 439.

1626. BURNS, GEORGE P. **Eccentric growth and the formation of redwood in the main stem of conifers.** *Vermont Agric. Exp. Sta. Bull.* 219. 1-10, Pl. 4, 10 fig. 1920.—See Bot. Absts. 7, Entry 318.

1627. CHANEY, RALPH W. **The flora of the Eagle Creek formation.** *Cont. Walker Mus.* 2⁵: 115-182. Pl. 5-22. 1920.—See Bot. Absts. 7, Entry 389.

1628. CORRÊA MENDES, F. C. **A panheira.** [Silk cotton.] *Bol. Agric. Nova Goa* [Portuguese East India] 1: 37-44. 1919.—Three species of trees yielding the product known as silk cotton or kapok are briefly described, *Bombax malabaricum* white or red silk cotton tree, *Cochlospermum gossypium* yellow silk cotton tree, and *Eriodendron anfractuosum* (*Ceiba pentandra*) silk cotton tree or kapok. A general discussion follows covering seed collection, nurseries, formation of plantations, collecting the cotton, its preparation for market, uses and yields.—John A. Stevenson.

1629. CORRÊA MENDES, F. C. **Viveiros.** [Nurseries.] *Bol. Agric. Nova Goa* [Portuguese East India] 1: 45-49. 1919.—A popular discussion of nurseries for forest tree seedlings, including choice of site, preparation of the soil, cultural directions, and transport of the plants when ready for final planting.—John A. Stevenson.

1630. COVILLE, FREDERICK V. **The influence of cold in stimulating the growth of plants.** *Proc. Nation. Acad. Sci. [U. S.]* 6: 434-435. 1920.—See Bot. Absts. 7, Entry 434.

1631. COWELL, ARTHUR WESTCOTT. **Awbury Arboretum Address.** *Bull. Geog. Soc. Philadelphia* 17: 98-102. July, 1919.—See Bot. Absts. 7, Entries 88, 1619.

1632. DACY, G. H. **How a state may grow a timber supply.** *Sci. Amer.* 123: 199. 3 fig. 1920.—An article dealing with a bill submitted to the state legislature of Massachusetts containing a practical and profitable plan for remedying the timber crisis in that state.—Chas. H. Otis.

1633. FARWELL, OLIVER A. Notes on the Michigan Flora, II. Michigan Acad. Sci. Ann. Rept. 21: 345-371. 1919.—See Bot. Absts. 7, Entry 487.

1634. GIBBS, VICARY. Oaks at Aldenham. Jour. Roy. Hort. Soc. 45: 155-233. Fig. 15-26. 1919.—A popular article giving the characteristics and behavior of over 75 species of *Quercus*, including some hybrids and varieties, brought from Asia, America, and continental Europe. Nearly all the types described are growing on the grounds of the author. It was found that trees from the nursery row grew especially well when planted in leaf mould underlaid with a thick bed of forest leaves.—J. K. Shaw.

1635. GRABHAM, MICHAEL. The cluster pine. Nature 105: 675-676. 1920.—*Pinus pinaster* was probably introduced into Madeira about 1770, and for general purposes is the most serviceable conifer yet seen in Madeira. Seed is sown in November or December with wheat, and yields stakes in 4 or 5 years and firewood in 12 or 15. The species does not sprout from the stump. Reference is made to some other conifers in Madeira.—O. A. Stevens.

1636. HAINES, H. H. Indian species of *Carissa*. Indian Forester 45: 375-388. Pl. 17-20. 7 fig. 1919.—See Bot. Absts. 7, Entry 520.

1637. HALL, CUTHBERT. On a new species or form of *Eucalyptus*. Proc. Linnean Soc. New South Wales 43: 747-749. Pl. 75. 1918.—See Bot. Absts. 7, Entry 521.

1638. HAUCH, L. A. Proveniensenforsøg med Eg. II. [Tests of climatic varieties of oak.] Forst. Forsøgsv. Danmark 5: 195-224. Pl. 6. 1920.—Twelve experimental plantations have been made with oaks from Denmark, Holland, Russia, Moravia, Hungary, Slavonia, South Austria, and Hanover. These were started in 1909. The results to date show that none of the introduced varieties can be used with absolute certainty and that the oaks of Danish origin are best suited for local use. The oaks from native seed are more robust and vigorous than those of foreign origin, their manner and time of development render them less liable to attack by mildew; the non-native oaks are generally more straight than the Danish variety; they develop more summer shoots which are long and slender and with diminutive buds strongly infected with mildew; often they do not ripen at all and are therefore less frost hardy. Leaves of the Danish oaks develop later in the spring and discolor earlier in the fall.—J. A. Larsen.

1639. HEINRICHER, E. Ein Versuch Samen, allenfalls Pflanzen, aus der Kreuzung einer Laubholzmistel mit der Tannenmistel zu gewinnen. [An attempt to secure seeds, perhaps plants, from the cross between the mistletoe of deciduous trees with that of the Coniferae.] Ber. Deutsch. Bot. Ges. 37: 392-398. Dec., 1919.

1640. HELMS, JOHS., OG PAUL WEGGE. Prikleforsøg paa Silkeborg og Vemmetofte Skovdistrikter. [Transplanting tests at Silkeborg and Vemmetofte forests.] Forst. Forsøgsv. Danmark 5: 225-292. Pl. 41. 1920.—Experiments in grading and pruning transplant stock of *Abies normandica* and *Picea excelsa* were carried out from 1915 to 1917. The large plants of spruce resist drought better than do the medium-sized ones and these in turn better than the smallest ones. Unpruned stock always gives the largest percentage of usable plants. Differences in survival of the grades are less marked in favorable than in dry seasons. Light root pruning produces practically no difference in a favorable season, but may result in much loss of pruned stock in a dry summer and may result in poor growth. If the second season is moist the tops develop most, whereas the root growth is proportionately larger in a dry season. Vigorous tamping of the soil after transplanting is useless. The third (smallest) class of seedlings should be discarded. Stock will stand more pruning on clay soil than on sandy soil,—on the latter only the long straggling roots should be cut.—J. A. Larsen.

1641. HOLTEN, A. To-aarig opbevaring af agern. [Storing acorns two years.] Dansk Skovforenings Tidsskr. 5: 191-198. 1920.—A considerable quantity of acorns which had been stored in the fall of 1918 gave 40 per cent germination in 1920. The author concludes

that in order to preserve the acorns two years it is necessary to use Hauch's method the first winter and to store them in dry sand the following spring and at such depth that the temperature will remain fairly constant.—*J. A. Larsen.*

1642. HOWARD, A. O. **The empire timber exhibition.** *Nature* 105: 691-693. 1920.—Apparently a temporary exhibit (made "at time of British Empire forestry conference"). Exhibits from: British East Africa, most important species being *Juniperus procera*—used for pencils; the Gold Coast, species of *Khaya* (African mahoganies), Odum (*Chlorophora excelsa*), Karkoo (*Lophira procera*); Nigeria, various sorts; Western Australia, special mention of Jarrah (*Eucalyptus diversicolor*) and Karri (*E. marginata*); Canada, especially Douglas fir (*Pseudotsuga Douglasii*), Sitka or silver spruce (*Picea sitchensis*) and basswood (*Tilia americana*); British Guiana, many of value which are as yet little known; Indian Empire, especially decorative woods; United Kingdom, about seventy varieties. Several other (British) countries exhibited woods.—*O. A. Stevens.*

1643. JACCARD, P. **Inversion de l'excentricité des branches produite experimentalement.** [The experimental inversion of the eccentricity of branches.] *Rev. Gén. Bot.* 32: 273-281. 2 pl., 1 fig. 1920.—See Bot. Absts. 7, Entry 431.

1644. KOIDZUMI, GENITI. **Contribuciones ad Floram Asiae Orientalis.** [Contributions to the flora of Eastern Asia.] *Bot. Mag. Tôkyô* 33: 217-223. 1919.—See Bot. Absts. 7, Entry 527.

1645. LECOMTE, HENRI. **Sur les principaux caractères de structure des bois.** [The principal characters in wood structure.] *Bull. Mus. Hist. Nat. Paris* 26: 166-171. 1920.—See Bot. Absts. 7, Entry 326.

1646. LEININGEN-WESTERBURG (GRAF ZU). **Rauchschäden und einschlagige bodenkundliche Fragen.** [Smoke injury and related matters of soil science.] *Forstwiss. Centralbl.* 42: 18-93. 1920.—See Bot. Absts. 7, Entry 459.

1647. MIYOSHI, MANABU. **Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal.** [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.] *Bot. Mag. Tôkyô* 33: 185-188. 1 photo. 1919.—See Bot. Absts. 4, Entry 452.

1648. MOREILLON, M. **Influence de l'ombrage sur la valeur des gazons dans les pâturages boisés.** [The influence of shade upon the value of the grasses in wooded pastures.] *Jour. Forest. Suisse* 70: 131-142. 1919.—See Bot. Absts. 7, Entry 39.

1649. MOULTON, R. H. **Wood that is stronger than steel.** *Sci. Amer.* 123: 204, 212. 5 fig. 1920.—How thin veneers and water-proof glue have been utilized in building a new industry.—*Chas. H. Otis.*

1650. MOUNT, H. A. **In the wake of the woodsman.** *Sci. Amer.* 123: 122, 137-138. 5 fig. 1920.—Popular.—*Chas. H. Otis.*

1651. MOUNT, H. A. **What about our forests?** *Sci. Amer.* 123: 62, 73-74. 3 fig. 1920.—Popular.—*Chas. H. Otis.*

1652. MOUNT, H. A. **What is wrong with our paper supply?** *Sci. Amer.* 122: 674, 688. 1 fig. 1920.

1653. MURRILL, W. A. **Where chocolate comes from.** *Sci. Amer.* 122: 626. 5 fig. 1920.—How the cacao bean, *Theobroma*, is grown and made into cocoa and chocolate.—*Chas. H. Otis.*

1654. NESS, H. [misprinted as N. Hess]. **Experiences in plant hybridization.** *Proc. Amer. Soc. Hort. Sci.* 16: 52-60. (1919) 1920.—See Bot. Absts. 7, Entry 228.

1655. NIKLAS, H. Die Bedeutung der Geologie für die land- und forstwirtschaftliche Bodenkunde. [The significance of the science of geology with relation to agricultural and forest soil science.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 22-35. 1920.—See Bot. Absts. 7, Entry 478.

1656. NIKLAS, H. Eine landwirtschaftliche Bodenübersichtskarte von Bayern. [An agricultural soil survey chart for Bavaria.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 62-65. 1920.—See Bot. Absts. 7, Entry 479.

1657. OSTENFELD, C. H. Bemaerkninger om Danske træers og buskes Systematisk udvise. [Systematic distribution of trees and shrubs in Denmark.] Dansk Skovforenings Tidsskr. 5: 164-182. Pl. 5. 1920.—The Danish basswood is not generally a forest tree though it is among the earliest recognized arborescent species in the country. Three species of basswood occur;—i. *Tilia platyphylla* Scop., (*T. grandifolia* Ehrh.). This species is here on the northern limit of its distribution. It entered Denmark during the warmer part of the post-glacial period and is now retrogressive both in Denmark and Sweden. ii. *Tilia cordata*, Mill. (*T. ulmifolia* Scop.; *T. microphylla* Vent.; *T. parvifolia* Ehrh.). This is hardier and more of a forest tree and of more general distribution than the former. iii. *Tilia cordata* × *platyphylla*. (*T. intermedia* D. b.; *T. europea* L.) A hybrid of rapid growth, vigorous but of limited distribution. It is used chiefly for shade trees and for parks.—J. A. Larsen.

1658. ROCK, JOSEPH F. One government forest. Hawaiian Forester and Agric. 16: 39-40. 3 pl. February, 1919.—See Bot. Absts. 7, Entry 493.

1659. ROWLAND, J. T. Pulp wood from Labrador. Sci. Amer. 123: 156. 3 fig. 1920.—Descriptive of a belt of timberland on the Labrador coast some 400 miles long, which is accessible by navigable waterways to an average depth of about 30 miles. The timber consists chiefly of spruce (*Picea nigra*) and tamarack (*Larix americana*) from a few inches to two feet in diameter at the butt; it is suitable for pulp wood but of little or no value for any other purpose.—Chas. H. Otis.

1660. SANDMO, J. K. Fremtidens Träslag. [Timber trees for the future.] Tidskr. Skogbruk 28: 154-165. Pl. 3. 1920.—Observations on *Pinus sylvestris*, *Pinus gallica*, and *Picea excelsa* in the Pyrenees Mountains lead the author to conclude that *P. excelsa* is better suited for higher elevations in Norway than *Pinus sylvestris*, and that *P. gallica* should be tried out at higher elevations in Norway in an effort to find a species which will advance the natural timberline.—J. A. Larsen.

1661. SCHUSTER, MATTHÄUS. Wie soll der Land- und Forstwirt geologische Karten lesen? [How shall the agriculturist and forester read geological charts?] Naturwiss. Zeitschr. Forst- u. Landw. 18: 10-22. 1 fig. 1920.—See Bot. Absts. 7, Entry 480.

1662. SECREST, EDMUND. Fire protection for forest lands. Monthly Bull. Ohio Agric. Exp. Sta. 5: 281-286. 1920.—Some five or six counties of southeastern Ohio are specially adapted for forest purposes because they cannot be profitably cleared for tillage or pasture. It is estimated that 750,000 acres of this land are menaced by fire and that 300,000 acres of woodland burn over at 1-10 year intervals. Protection against fire is more essential than planting. The general code of Ohio contains no enactments designed to control the evil. Legislation in this respect is urgently needed. Suggestions are made for the protection of timber lands of Ohio against forest fires, making the township the logical unit.—R. C. Thomas.

1663. SPRINGER, J. F. The twentieth-century lumber-jack. Sci. Amer. 123: 34, 48-50. 4 fig. 1920.—Describes modern methods and machines.—Chas. H. Otis.

1664. TIEMANN, HARRY D. Phenomena of drying wood. Jour. Franklin Inst. 189: 645-648. 1 fig. 1920.—The description of a mechanical device which illustrates the phenomena of normal shrinkage, the "set" or fixation, and the increase in strength and hardness of wood when it loses moisture. [See Bot. Absts. 4, Entry 476.]—Ernest Shaw Reynolds.

1665. VUILLEMIN, P. L'amphigonelle et la phylogénie des amentales. [The "amphigonelle" and the phylogeny of the Amentales.] Ann. Sci. Nat. Bot. X, 1: 139-200. 1919.—See Bot. Absts. 7, Entry 336.

1666. WEBSTER, A. D. The systematic afforestation of Great Britain. Jour. Roy. Hort. Soc. 45: 278-288. 1919.

1667. ZELLER, S. M. Humidity in relation to moisture imbibition by wood and to spore germination on wood. Ann. Missouri Bot. Gard. 7: 51-74. 1 pl., 5 fig. 1920.—See Bot. Absts. 7, Entry 400.

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

1668. AGAR, W. E. The genetics of a *Daphnia* hybrid during parthenogenesis. Jour. Genetics 10: 303-330. 3 fig. Dec., 1920.—Attempts to get intergeneric crosses between *Daphnia* and *Simocephalus* failed. Reciprocal hybrids were obtained between *Daphnia obtusa* and *D. pulex*, though the percentage of successful matings between parent species was low. Few of the fertilized eggs of hybrid or straight matings hatched. From 21 fertile ephippia from cross-matings hatched, only three young were produced, two of which gave offspring. One was lost after three generations, others were carried ten parthenogenetic generations. Hybrid clones were characterized by (1) excessive production of sexual eggs, (2) excessive production of males, (3) complete sterility of males, (4) incomplete fertility of parthenogenetic eggs (approximately half failed to develop), and (5) probably normal fertility of sexual eggs (when fertilized by males from parent clones).—As a character for study of inheritance author used ratio between body length and length of second abdominal process, and ratio between lengths of second and third abdominal processes. The former (mean) ratio for males of *D. obtusa* of the parent clone was 30.8, for *D. pulex* 6.2, and for the hybrid clone 10.1. The latter ratio for the females of *D. obtusa* was 2.17, for *D. pulex* 2.89, and for the hybrid clone 1.97. The distribution curves of the hybrids while slightly skew (due to environmental factors) were steep curves and showed no tendency toward bi- or multimodality. "There is no evidence of progressive increase in diversity in successive generations, whether measured by the standard deviation or by the extreme range of variation." The conclusion is "that during the parthenogenetic reproduction of these forms, which is not accompanied by reduction of chromosomes, Mendelian segregation does not take place, nor does genetic diversity between parent and offspring normally arise."—A. M. Banta.

1669. ANONYMOUS. A common misconception concerning human heredity. Jour. Heredity 10: 275. 1919.—Environment produces greater modifications in plant life than in animal, and far greater on simpler animal tissue than on the more complex.—J. H. Beaumont.

1670. ANONYMOUS. Disease proof potatoes. Florists' Exchange 50: 1067. Nov. 20, 1920.—Certain potato varieties, including Irish Cobbler, are immune to wart disease. No variety, however, has appeared that is resistant to late blight (*Phytophthora*), although some varieties are more resistant than others.—Richard Wellington.

1671. ANONYMOUS. A factor influencing the sex-ratio. Jour. Heredity 10: 256. June, 1919.—Author shows from the results of HELEN DEAN KING, MORGAN, RIDDLE, MOENKHAUS, and PAPANICOLAU that the female has more influence in determining the sex-ratio, though a knowledge of the interactions of the germ-cells must be gained before the problem can be solved.—J. H. Beaumont.

1672. ANONYMOUS. Heredity of cancer. Jour. Heredity 10: 89. 1919.—Pointing out racial susceptibility and some family susceptibilities to cancer as argument for placing cancer on a heredity basis.—J. H. Beaumont.

1673. ANONYMOUS. **Inheritance of continuous and discontinuous variations.** Jour. Heredity 10: 191. April, 1919.—An article pointing out the conclusions of Dr. F. B. SUMMER in his paper entitled "Continuous variations and their inheritance in *Peromyscus*. III." Amer. Nat. 52: 439-454. Aug.-Sept., 1918 (See Bot. Absts. 1, Entry, 943), which do not support the views of BATESON and DE VRIES. Summer's case is parallel to that of CASTLE's hooded rats.—J. H. Beaumont.

1674. ANONYMOUS. **Some present aspects of immigration.** Jour. Heredity 10: 68-70. Feb., 1919.—Fourth report of the committee on immigration of the American Genetic Association. The committee finds that the new law, effective May 1, 1917, if properly enforced can become of immense benefit to our future race. The percentage of exclusions due to mental and physical disease has risen due to increased fines, imposed on transportation companies, and to better examination. The committee is of the opinion that a considerable restriction or temporary suspension of alien immigration would have highly desirable eugenic results.—J. H. Beaumont.

1675. ANONYMOUS. [German rev. of: ÅKERMAN, Å. **Speltlike bud-sports in common wheat.** Hereditas 1: 116-127. 6 fig. 1920. (See Bot. Absts. 6, Entry 1565.)] Zeitschr. Pflanzenzücht. 7: 320. Nov., 1920.

1676. ANONYMOUS. [German rev. of: ALLARD, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of *Nicotiana rustica*.** Amer. Nat. 53: 234-238. May-June, 1919. (See Bot. Absts. 3, Entry 217.)] Zeitschr. Pflanzenzücht. 7: 320. Nov., 1920.

1677. ANONYMOUS. [German rev. of: ANTHONY, STEPHEN, AND HARRY V. HARLAN. **Germination of barley pollen.** Jour. Agric. Res. 18: 525-536. 2 pl., 2 fig. Feb. 16, 1920. (See Bot. Absts. 4, Entry 2802; 5, Entries 949, 1449.)] Zeitschr. Pflanzenzücht. 7: 320. Nov., 1920.

1678. ANONYMOUS. [German rev. of: BLAKESLEE, ALBERT F., AND B. T. AVERY, JR. **Mutations in the jimson weed.** Jour. Heredity 10: 111-120. Fig. 5-15. Mar., 1919. (See Bot. Absts. 3, Entry 980.)] Zeitschr. Pflanzenzücht. 7: 321. Nov., 1920.

1679. ANONYMOUS. [German rev. of: BROILI. **Solanum edinense Berthault, ein für die Landwirtschaft wertvoller Kartoffelbastard.** (*Solanum edinense Berthault, a potato hybrid valuable for agriculture.*) Deutsch. Landw. Presse 1920: 359-361. 1920.] Zeitschr. Pflanzenzücht. 7: 321. Nov., 1920.

1680. ANONYMOUS. [German rev. of: COLLINS, G. N., AND J. H. KEMPTON. **Heritable characters of maize. I. Lineate leaves.** Jour. Heredity 11: 3-6. Jan., 1920. (See Bot. Absts. 7, Entry 1737.)] Zeitschr. Pflanzenzücht. 7: 321. Nov., 1920.

1681. ANONYMOUS. [German rev. of: COLLINS, J. L. **Chimeras in corn hybrids.** Jour. Heredity 10: 2-10. 7 fig. Jan., 1919 (See Bot. Absts. 2, Entry 930; 3, Entry 2104.)] Zeitschr. Pflanzenzücht. 7: 321-322. Nov., 1920.

1682. ANONYMOUS. [German rev. of: DORSEY, M. J. **A note on the dropping of flowers in the potato.** Jour. Heredity 10: 226-228. Fig. 19. May, 1919.] Zeitschr. Pflanzenzücht. 7: 322. Nov., 1920.

1683. ANONYMOUS. [German rev. of: EAST, EDWARD M., AND DONALD F. JONES. **Inbreeding and outbreeding.** 14 x 21 cm., 285 p., 46 fig. J. B. Lippincott: Philadelphia, 1919. (See Bot. Absts. 4, Entries 571, 2290, 3460; 5, Entries 1695, 1607.)] Zeitschr. Pflanzenzücht. 7: 341-342. Nov., 1920.

1684. ANONYMOUS. [German rev. of: EMERSON, R. A. **Heritable characters of maize. II. Pistillate-flowered maize plants.** Jour. Heredity 11: 65-76. 8 fig. Feb., 1920. (See Bot. Absts. 7, Entry 1745.)] Zeitschr. Pflanzenzücht. 7: 322. Nov., 1920.

1685. ANONYMOUS. [German rev. of: ERNST, A. *Über Parthenogenesis und Apogamie.* (On parthenogenesis and apogamy.) *Verhandl. Schweiz. Naturf. Ges.* 1919: 1-20. 1919. *IDEM.* *Über den Ursprung der apogamen Angiospermen.* (On the origin of apogamous angiosperms.) *Vierteljahrsschr. Naturforsch. Ges. Zurich* 1917: 336-348. 1917.] *Zeitschr. Pflanzenzücht.* 7: 323. Nov., 1920.

1686. ANONYMOUS. [German rev. of: FEENSTRA-SLUITER, C. *Waarnemingen en Beschouwingen over Bloei Bevruchtung en Zaadvorming bij Cinchona Ledgeriana Moens.* (Observations and considerations of flowering, fertilization and seed formation in *Cinchona Ledgeriana* Moens.) *Mededeel. Kina-Proefsta.* 6. 35 p., 20 fig. 1919. (See Bot. Absts. 4, Entry 986.)] *Zeitschr. Pflanzenzücht.* 7: 323-324. Nov., 1920.

1687. ANONYMOUS. [German rev. of: FREEMAN, G. F. *Linked quantitative characters in wheat crosses.* *Amer. Nat.* 51: 683-689. 1917.] *Zeitschr. Pflanzenzücht.* 7: 324. Nov., 1920.

1688. ANONYMOUS. [German rev. of: FREEMAN, G. F. *Producing bread making wheats for warm climates.* *Jour. Heredity* 9: 211-226. May-June, 1918. (See Bot. Absts. 1, Entry 221.)] *Zeitschr. Pflanzenzücht.* 7: 324. Nov., 1920.

1689. ANONYMOUS. [German rev. of: HAGEDOORN-LA BRAND, A. C., AND A. L. HAGEDOORN. *Parthenogenesis in higher plants.* *Teysmannia* 27: 643-656. 1 pl. 1917. (See Bot. Absts. 1, Entry 1793.)] *Zeitschr. Pflanzenzücht.* 7: 325. Nov., 1920.

1690. ANONYMOUS. [German rev. of: HAYES, H. K. *Natural crossing in wheat.* *Jour. Heredity* 9: 326-330, 334. Fig. 14-15. Nov., 1918. (See Bot. Absts. 1, Entry 1503.)] *Zeitschr. Pflanzenzücht.* 7: 325-326. Nov., 1920.

1691. ANONYMOUS. [German rev. of: HERIBERT-NILSSON, N. *Zuwachsgeschwindigkeit der Pollenschläuche und gestörte Mendelzahlen bei Oenothera Lamarckiana.* (Decline in pollen-tube growth and deranged Mendelian ratios in *Oenothera Lamarckiana*.) *Hereditas* 1: 41-67. 1 fig. 1920. (See Bot. Absts. 6, Entry 1689.)] *Zeitschr. Pflanzenzücht.* 7: 327. Nov., 1920.

1692. ANONYMOUS. [German rev. of: HEUSSER, C. *Over de selectie van Hevea Brasiliensis Müll.* (On selection in *Hevea brasiliensis*.) *Arch. Rubbercult. Nederlandsch-Indië* 3: 1919.] *Zeitschr. Pflanzenzücht.* 7: 326. Nov., 1920.

1693. ANONYMOUS. [German rev. of: HONING, J. A. *A sterile dwarf form of Deli tobacco originated as a hybrid.* *Bull. Deli Proefsta. Medan* 10: 24. 4 pl. 1917.] *Zeitschr. Pflanzenzücht.* 7: 326. Nov., 1920.

1694. ANONYMOUS. [German rev. of: JOHNSON, JAMES. *An improved strain of Wisconsin tobacco.* *Jour. Heredity* 10: 281-288. Fig. 8-10. June, 1919. (See Bot. Absts. 7, Entry 1776.)] *Zeitschr. Pflanzenzücht.* 7: 327. Nov., 1920.

1695. ANONYMOUS. [German rev. of: JONES, D. F. *Selection in self-fertilized lines as the basis for corn improvement.* *Jour. Amer. Soc. Agron.* 12: 77-100. 1920. (See Bot. Absts. 5, Entry 1543.)] *Zeitschr. Pflanzenzücht.* 7: 328. Nov., 1920.

1696. ANONYMOUS. [German rev. of: KEMPTON, J. H. *Heritable characters of maize. III. Brachytic culms.* *Jour. Heredity* 11: 111-115. 4 fig. Mar., 1920. (See Bot. Absts. 7, Entry 1787.)] *Zeitschr. Pflanzenzücht.* 7: 328. Nov., 1920.

1697. ANONYMOUS. [German rev. of: KOCH, L. *De beteekenis van de bastaardselectie bij padi en how deze wordt uitgevoerd.* (The significance of hybrid selection in rice and how it is conducted.) *Teysmannia* 1916: 502-519. 1916.] *Zeitschr. Pflanzenzücht.* 7: 329. Nov., 1920.

1698. ANONYMOUS. [German rev. of: KOCH, L. *Onderzoekingen betreffende de praktijkwaarde van de lijnselectie methode voor verschillende eenjarige landbouwgewassen.* (Investigations concerning the practical value of the line selection method for different annual agricultural plants.) *Teysmannia* 29: 1-36, 96-127, 156-191, 389-423. 1918. (See Bot. Absts. 5, Entry 1551.)] *Zeitschr. Pflanzenzücht.* 7: 329-331. Nov., 1920.

1699. ANONYMOUS. [German rev. of: KOCH, L. *Uitkomsten van eenige selectieproeven met padi.* (Results with some selection experiments with rice.) *Korte Ber. Selectie- en Zaadtuin Dept. Landb. Nijv. en Handel [Buitenzorg]* 21. 16 p. July, 1919. (See Bot. Absts. 6, Entry 688.)] *Zeitschr. Pflanzenzücht.* 7: 331. Nov., 1920.

1700. ANONYMOUS. [German rev. of: KOCH, L. *Uitkomsten van onderzoekingen over enkele kenmerken en eigenschappen van het padigewas.* (Results of an investigation of some characteristics of the rice plant.) *Korte Ber. Selectie- en Zaadtuinen Dept. Landb. Nijv. en Handel [Buitenzorg]* 7. 4 p. Nov., 1917.] *Zeitschr. Pflanzenzücht.* 7: 332. Nov., 1920.

1701. ANONYMOUS. [German rev. of: KOCH, L. *Uitkomsten van eenige selectieproeven met padi.* (Results of selection experiments with rice.) *Korte Ber. Landbouwvoorlichtingsdienst Dept. Landb. Nijv. en Handel [Buitenzorg]* No. 1, 1916. No. 5, Nov., 1917. No. 6, Nov., 1917. No. 8, Aug., 1918.] *Zeitschr. Pflanzenzücht.* 7: 332. Nov., 1918.

1702. ANONYMOUS. [German rev. of: KOTOWSKI, FELIKS. *Zmiennósé i Korrelacye w "czystej linii" pszenicy.* Tr. vulgare Ostka biala dublańska. (Correlation and variability in a pure line of wheat.) *Polnisch: Tygodnika Rolnivzy, Krakau*, 1919.] *Zeitschr. Pflanzenzücht.* 7: 333-334. Nov., 1920.

1703. ANONYMOUS. [German rev. of: LEIGHTY, CLYDE E. *Natural wheat-rye hybrids of 1918.* *Jour. Heredity* 11: 129-136. 4 fig. Mar., 1920. (See Bot. Absts. 7, Entry 1797.)] *Zeitschr. Pflanzenzücht.* 7: 334. Nov., 1920.

1704. ANONYMOUS. [German rev. of: LEVERENZ, C. *Die meistgebauten landwirtschaftlichen Pflanzenzüchten Deutschlands mit Ausnahme der Kartoffeln.* (The principal agricultural plant breeds of Germany, with exception of potatoes.) *Landwirtschaftskammer f. d. Provinz Sachsen.* 79 p. Hermann Kuhnt: Halle, 1920.] *Zeitschr. Pflanzenzücht.* 7: 342-343. Nov., 1920.

1705. ANONYMOUS. *Begonia breeding.* [Rev. of: MOORE, H. J. *Mendel's law in the genus Begonia.* *Canadian Florist* 15: 327-328. Nov. 25, 1920.] *Florists' Exchange* 50: 967. Nov. 6, 1920.

1706. ANONYMOUS. [German rev. of: NAFZIGER, T. E. *How sorghum crosses are made.* *Jour. Heredity* 9: 321-322. Nov., 1918. (See Bot. Absts. 2, Entry 39.)] *Zeitschr. Pflanzenzücht.* 7: 336. Nov., 1920.

1707. ANONYMOUS. [German rev. of: NILSSON-EHLE, H. *Über Resistenz gegen Heterodera Schachtel bei gewissen Gerstensorten, ihre Vererbungsweise und Bedeutung für die Praxis.* (On resistance to *Heterodera Schachtel* in certain varieties of barley, its method of inheritance and significance for agricultural practise.) *Hereditas* 1: 1-34. 4 fig. 1920. (See Bot. Absts. 6, Entry 1731.)] *Zeitschr. Pflanzenzücht.* 7: 336. Nov., 1920.

1708. ANONYMOUS. [German rev. of: RASMUSSEN, J. *Mendelnde Chlorophyll-faktoren bei Allium cepa.* (Mendelian chlorophyll factors in *Allium cepa*.) *Hereditas* 1: 128-134. 1920. (See Bot. Absts. 6, Entry 1739.)] *Zeitschr. Pflanzenzücht.* 7: 337. Nov., 1920.

1709. ANONYMOUS. [Rev. of: SALMON, E. S. *On forms of the hop (Humulus lupulus L., and H. americanus, Nutt.) resistant to mildew (Sphaerotheca humuli D. C. Burr.)* IV. *Ann. Applied Biol.* 6: 293-310. 1920. (See Bot. Absts. 7, Entry 933.)] *Gard. Chron.* 68: 259. Nov. 27, 1920.

1710. ANONYMOUS. [German rev. of: TEDIN, HANS. The inheritance of flower colour in *Pisum*. *Hereditas* 1: 68-97. 1 colored pl., 2 fig. 1920. (See Bot. Absts. 6, Entry 1776.)] *Zeitschr. Pflanzenzücht.* 7: 337-338. Nov., 1920.

1711. ANONYMOUS. [German rev. of: TISCHLER, G. Ueber die sogenannten "Erbsubstanzen" und ihre Lokalisation in der Pflanzenzelle. (On the so-called hereditary substances and their localization in the plant cell.) *Biol. Zentralbl.* 40: 15-28. 1920. (See Bot. Absts. 7, Entry 939.)] *Zeitschr. Pflanzenzücht.* 7: 338. Nov., 1920.

1712. ANONYMOUS. [German rev. of: TIEBES, K., EN H. N. KOOIMAN. Erfelijkheidsonderzoekingen by boonen. III. Albinisme. (Hybridization experiments with beans. III. Albinism.) *Genetica* 1: 532-538. 1 pl., 3 fig. Nov., 1919. (See Bot. Absts. 6, Entry 1135.)] *Zeitschr. Pflanzenzücht.* 7: 338. Nov., 1920.

1713. ANONYMOUS. [German rev. of: VON UBISCH, G. Anwendung der Vererbungsgesetze auf die Kulturpflanzen. (Application of the laws of heredity to cultivated plants.) *Naturwissenschaften* 8: 293-300. 1920.] *Zeitschr. Pflanzenzücht.* 7: 339. Nov., 1920.

1714. ANONYMOUS. [German rev. of: URBAN, J. Die Grösse der Rübenknäuel und der Rübenantrag. (Size of the beet seed-balls and the yield of beets.) *Zeitschr. Zuckerind. Cechoslovak.* 44: 151-155. 1920.] *Zeitschr. Pflanzenzücht.* 7: 339. Nov., 1920.

1715. ANONYMOUS. [German rev. of: WHITE, O. E. Inheritance studies in *Pisum*. IV. Interrelation of the genetic factors of *Pisum*. *Jour. Agric. Res.* 11: 167-190. 1917. (See Bot. Absts. 1, Entry 1315.)] *Zeitschr. Pflanzenzücht.* 7: 340. Nov., 1920.

1716. ANONYMOUS. [German rev. of: WHITE, O. E. The present state of knowledge of heredity and variation in peas. *Proc. Amer. Phil. Soc.* 56: 487-588. 1917.] *Zeitschr. Pflanzenzücht.* 7: 339. Nov., 1920.

1717. ANONYMOUS. [German rev. of: ZALESKI, LEOPOLD. Wkwestyi metod analitycznych w selekcji buraków pastewnych. (Contribution to the analytical method in fodder-beet breeding.) *Ziemianin* Posen, 1920.] *Zeitschr. Pflanzenzücht.* 7: 340. Nov., 1920.

1718. ANONYMOUS. [German rev. of: ZINN, JACOB. On variation in Tartary buckwheat, *Fagopyrum tartaricum* (L) Gaertn. *Genetica* 4: 534-586. 11 fig. Nov., 1919.] *Zeitschr. Pflanzenzücht.* 7: 340. Nov., 1920.

1719. BABCOCK, ERNEST B., AND JULIUS L. COLLINS. Interspecific hybrids in *Crepis*. I. *Crepis capillaris* (L) Walh. × *Crepis tectorum* L. *Univ. California Publ. Agric. Sci.* 2: 191-204. Pl. 36-38. 1920.—Reciprocal crosses were made between *Crepis capillaris* which has three pairs of chromosomes and *C. tectorum* which has four pairs. The F_1 's showed dominance of the *tectorum* cotyledon characters as well as hybrid vigor, but did not survive beyond the cotyledon stage. Cells of the root tips of the F_1 seedlings contained seven chromosomes, the sum of the haploid numbers of the two species. Examination of a young F_1 seedling which had reached the limit of development revealed an unusual teratological cell condition. This interruption of the functioning systems, which causes the premature death of the plant, is regarded as evidence against the hypothesis that *C. tectorum* originated by non-disjunction of one pair of the *capillaris* chromosomes.—C. B. Hutchison.

1720. BANNIER, J. P. [Dutch rev. of: CORRENS, C. Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtiger Pflanzen. (Sex tendency of germ-cells in plants of mixed sex.) *Zeitschr. Bot.* 12: 49-60. 2 fig. 1920.] *Genetica* 2: 451-452. Sept., 1920.

1721. BANNIER, J. P. [Dutch rev. of: COULTER, MERLE C. Inheritance of aleurone color in maize. *Bot. Gaz.* 69: 407-425. May, 1920. (See Bot. Absts. 5, Entry 1477.)] *Genetica* 2: 452-453. Sept., 1920.

1722. BANNIER, J. P. [Dutch rev. of: STOUT, A. B. *Intersexes in Plantago lanceolata*. Bot. Gaz. 68: 109-133. 1919. (See Bot. Absts. 3, Entry 1517.)] *Genetica* 2: 476-477. Sept., 1920.

1723. BAUMANN, E. Beiträge zu der Individual- und Immunitätszüchtung bei der Kartoffel. [Contributions on the question of individual and immunity breeding of the potato.] Jour. Landw. 68: 145-206. 1 fig. 1920.—These investigations on two commercial varieties of potatoes show the practical possibility of increasing production of the crop by means of pure-line selection, securing in this way strains that are resistant or practically immune to several diseases. Data are given on these points: plant yield; starch content and starch yield, with correlation of these; number, size and starch content of tubers; correlation of number and size of tubers with tuber yield and starch yield; influence of weather conditions and disease on yield; food qualities and cooking values.—C. E. Leighty.

1724. BECKER, J. Xenien zwischen Melonen und Gurken. [Xenia between muskmelons and cucumbers.] Zeitschr. Pflanzenzücht. 7: 362-364. Nov., 1920.

1725. BENDERS. [Dutch rev. of: DOYER, J. J. TH. Proeve van een onderzoek omtrent het familiair en hereditair voorkomen van tuberculose volgens de wetenschappelijk-genealogische methode. (Preliminary researches about the familial and hereditary occurrence of tuberculosis following scientific genealogical methods.) 214 p., 7 genealogical trees, and 258 quarter tables. Diss. J. B. Wolters U. M.: Groningen, 1920. (See Bot. Absts. 6, Entry 1074.)] *Genetica* 2: 453-459. Sept., 1920.

1726. BENDERS. [Dutch rev. of: SLYE, MAUD. The relation of inbreeding to tumor production: studies in the incidence and inheritability of spontaneous tumors in mice. Jour. Cancer Res. Jan., 1920.] *Genetica* 2: 475. Sept., 1920.

1727. BLAKESLEE, A. F. A dwarf mutation in *Portulaca* showing vegetative reversions. *Genetics* 5: 419-433. 1 fig. July, 1920.—One compact dwarf plant, found in a sowing of *Portulaca grandiflora*, was crossed with varieties of the normal form. The normal appeared completely dominant. The dwarfs showed no red in the stems (except in the seedling stage) while the corresponding normals did. Dwarfs selfed gave 2653 dwarf to 14 normal. With this exception, normal and dwarf were proved to act as a simple Mendelian pair, assuming that the dwarfs are less viable. Ten of the selfed dwarfs produced 1294 dwarfs, which were specially examined, and 16 bore some normal branches with long internodes and red stems. These branches were shown to be heterozygous; while the other branches of the plants which bore them proved to be homozygous dwarf. Since these ten parents also bore 7 normals, there was a total mutation from recessive to dominant of 1.8 per cent. Mutations, like the original, from dominant to recessive, could not be visible in homozygous normals, and might readily be overlooked in heterozygotes.—John Belling.

1728. BONNIER, GASTON. Sur les changements, obtenus expérimentalement, dans les formes végétales. [On the alterations experimentally obtained in the form of plants.] Compt. Rend. Acad. Sci. Paris 170: 1356-1359. 1920.

1729. BROILL. *Solanum edinense* Berthault, ein für die Landwirtschaft wertvoller Kartoffelbastard. [*Solanum edinense* Berthault, a potato hybrid valuable for agriculture.] Deutsch. Landw. Presse 1920: 359-361. 1920.

1730. BROŽEK, ARTHUR. Mosaikbastard. *Mimulus tigrinoides* Hort., hybrida var. Paulina (var. nova). [A mosaic hybrid. *Mimulus tigrinoides* Hort. hybrida var. Paulina (var. nova).] Lékařske Rozhledy 7: 8-12, 221-232. 1920.

1731. BRÜEL, L. [German rev. of: ROUX, W. Über die bei der Vererbung von Variationen anzunehmenden Vorgänge, nebst einer Einschaltung über die Hauptarten des Entwicklungsgeschehens. (On the putative processes in the inheritance of variations and an interpolation on the chief kinds of developmental phenomena.) Vortr. Aufsätze u. Entwicklungsmech. Org. 63 p., 1913.] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 291-292. Nov., 1920.

1732. BRYN, HALFDAN. **Researches into anthropological heredity.** *Hereditas* 1: 186-212. 1920.—The studies have been conducted in "two much isolated mountain districts" of Norway. The paper is in two parts, the first "On the inheritance of eye colour in man." The eyes of 834 individuals were examined through a magnifying glass and two types of eye color distinguished: (1) eyes with "a single layer of black pigment in the back part of iris, appearing always blue or gray;" (2) eyes "which besides this pigment also contains a more or less brownish one, which eyes appear brown, green, gray, bluish-brown or blue if the brownish pigment is to be found very scantily." Under the latter type is segregated also a group of "mixed" eyes, which appears to yield at least one biotype. Individuals homozygous for "brown" eyes are "probably very rare in the population," hence the mode of inheritance was not especially studied. In general it was found that "in our population there are probably three biological types with regard to eye-colour; (a) the plain blue type; (b) the plain brown type; (c) the light 'mixed' type. These different types interbreed in accord with the Mendelian laws of heredity, viz., blue eyes are recessive to all types of eyes with brownish pigment."—The second part of the paper treats of "The genetic relation of index cephalicus." The two districts mentioned "differ very much with regard to the size of this index;" one "characterized as rather brachycephalic," having an index of 80.1, the other an index of 76.9, while "the average index of the entire country is about 78.0." A careful study of the collected data shows "very plainly that there are at least two types in each of the districts. One is common to both districts. It is the northern fair nucleus," with an index of about 77.5. In one district this is associated with "a dark brachycephalic type," index about 83, and in the other district it is associated with a "dark dolichocephalic type," index about 73. The author concludes that there are here "three biotypes . . . with regard to index cephalicus" which interbreed in Mendelian fashion. "The brachycephalic type is dominant to both the others. The dolichocephalic type is too rare to allow any positive conclusions; it seems, however, to be dominant to the mesocephalic type and recessive to the brachycephalic type."—Howard J. Banker.

1733. BURCH, D. S. **Heredity and economical production of food.** *Jour. Heredity* 11: 7-11. 2 fig. 1920.—Pointing out the lack of thought and knowledge of the principles of breeding and a discussion of the work of the Federal Department of Agriculture to encourage the application of these principles to livestock and farm crops.—J. H. Beaumont.

1734. CASTLE, W. E. **Genetics and eugenics.** 2nd ed., 15.5 × 23.5 cm., 395 p., 7 pl., 155 fig. Harvard Univ. Press: Cambridge, Massachusetts, 1920.—Second edition shows extensive revision with addition of much new matter mainly represented by interpolated chapters on "Genetic changes and the chromosomes," "Genetic changes in asexual reproduction, in parthenogenesis, and in self-fertilization," "Genetic changes in bisexual reproduction," and "Hybrid vigor and heterosis." The author's hooded-rat results are shown to be due to the action of modifying factors, on an unchanged fundamental gene for the hooded character; and blending inheritance, and Johannsen's pure-line principle are also given new treatment which brings the author's position on these subjects into better accord with that generally held by other geneticists. The extensive bibliography which was an excellent feature of the first edition has been brought down nearly to date of publication of the second edition, by the addition of more than 200 titles.—Geo. H. Shull.

1735. CHAMBERLAIN, CHARLES J. **Grouping and mutation in Botrychium.** *Bot. Gaz.* 70: 387-398. 11 fig. Nov., 1920.—*B. dissectum* never occurs except in association with *B. obliquum*. In *B. dissectum* many sporangia are abortive, and many spores of apparently perfect sporangia are obviously abortive, suggesting at least partial, and probably entire, sterility. *Botrychium* does not reproduce vegetatively; hence *B. dissectum* must arise from mutating spores (2-5 per cent) of *B. obliquum*. Direct cultural proof is impossible, since *Botrychium* spores cannot be germinated artificially.—Merle C. Coulter.

1736. COLE, LEON J. **An early family history of color-blindness.** *Jour. Heredity* 10: 372-374. Fig. 12. Nov., 1919.—The Philosophical Transactions of the Royal Society of

London for 1779 contain a rather complete family history of color-blindness, of interest because of its early date and because the facts as given fall in line with the interpretation of color-blindness as a sex-linked character in man.—*J. H. Beaumont.*

1737. COLLINS, G. N., AND J. H. KEMPTON. **Heritable characters of maize. I. Lineate leaves.** Jour. Heredity 11: 3-6. *Frontispiece.* Jan., 1920.—The authors point out the desirability of reporting characters of genetic value as they appear in such an economic crop as maize in order to avoid needless duplication by the workers in the field. They discuss the character "lineate" and show that it may take its place among the other chlorophyll variations of maize. [See also Bot. Absts. 7, Entry 1680.]—*J. H. Beaumont.*

1738. VAN CREVELD, S. [Dutch rev. of: HARRIS, J. ARTHUR, AND FRANCIS G. BENEDICT. **A biometric study of basal metabolism in man.** Carnegie Inst. Washington Publ. 279. *v + 266 p., 28 diagrams.* Washington, D. C., 1919.] *Genetica* 2: 466-468. Sept., 1920.

1739. DANFORTH, C. H. **Resemblance and difference in twins.** Jour. Heredity 10: 399-409. *Fig. 9-14.* Dec., 1919.—A discussion of the answers to questionnaires received by the American Genetic Association from a number of twins. The answers to questions of the general headings: height, weight, hair and eye color, physical traits, physiological traits, mental traits and stronger affection, indicate that in uniovular twins identical likenesses are the rule, while in biovular twins differences of the same order as between children of different ages may be expected though striking similarities do occur in biovular twins of the same sex. The author discusses the extent of similarity in biovular twins and the reason for expecting differences in uniovular twins.—*J. H. Beaumont.*

1740. DANIEL, LUCIEN. **Recherches sur la greffe des Solanum.** [Studies on the graft of Solanum.] *Compt. Rend. Acad. Sci. Paris* 171: 1074-1076. Nov. 29, 1920.

1741. DAVENPORT, CHARLES B. **Heredity of constitutional mental disorders.** Psychol. Bull. 7: 300-310. Sept., 1920.—The author reports chiefly his own investigations, but also cites the most significant findings of recent study by others.—Analyses of the pedigrees of feeble-minded individuals yield results supporting the conclusion that there is a single Mendelian factor absent in the ordinary type of feeble-mindedness. If the germ defect results in the insufficient production of some hormone upon which the higher functions depend, the intellectual centers develop each with its own idiosyncrasies and cease development prematurely at a low level. In the most extensive pedigrees the defect has been traced for nine or more generations and it is suspected that if records were obtainable it would go back 2000 years or more.—Contrary to former assertion on the non-inheritance of Mongolian imbecility, recent investigations reveal neurotic conditions in both lines of ancestry.—Amaurotic idiocy is apparently confined to families of Russian Jews.—It is not yet possible to say that every case of epilepsy is inherited, but it is certain that in a majority of instances there is nervous defect on both sides of the family. The element of periodicity in epilepsy has a clear inheritable basis and the tendency to fugues is evidently a sex-linked trait, i.e., a nomadic male inherits it from his mother's close male relatives.—The method of inheritance of dementia praecox has been investigated by several authors all of whom conclude that it is a simple Mendelian recessive. On the other hand Huntington's chorea and the temperamental tendency to more or less periodic outbursts of violence seems to be a Mendelian dominant. In the manic-depressive group of psychoses the hyperkinetic tendency is inherited independently of the hypokinetic. The author formulates the hypothesis that the presence or absence of genetic factors determines an individual's reactivity to exciting situations. The history of changes of mood in identical twins strikingly corroborates the view.—The question of inheritance of criminality receives the author's negative judgment except in so far as the etiology is found in the inheritable traits of feeble-mindedness, feeble inhibition, or defective internal secretions.—The bearing of consanguinity upon mental disorders is confined to matings in which both parents carry some recessive defect.—*Miriam C. Gould.*

1742. DAVENPORT, C. B. Annual report of the Director of the Department of Experimental Evolution and of the Eugenics Record Office. Carnegie Inst. Washington Year Book 19. (1920): 107-157. 1921.—Surveying the past, author points out part played by his Staff in helping to establish relation of chromosomes to genetical facts and as to future plans he emphasizes the eugenical, and the desirability of much mammalian experimentation as likely to bear strongest on human genetics. METZ reports on gametogenesis in *Asilus* and *Drosophila* and finds indications in latter of process differing in male and female. A set of 3 allelomorphous mutations of the eye in *D. virilis* is mentioned, of which 2 are accompanied by more or less sterility. MACDOWELL has completed a report showing that alcoholic grandparents diminish learning and retention ability of rats. Alcoholic parents showed similar but less marked influence on children, although latter were one generation nearer to the alcohol. RIDDLE studied metabolism of male and female embryos in doves and pigeons. Relatively more female than male embryos withstood diminished oxygen pressure, indicating lower metabolism in females. Age of embryo is important factor in survival. LITTLE demonstrated presence of sex-linked lethal factors in mice causing ratio of sexes of about 1 male to 2 females. Statistical analysis of human pedigrees of hemophilia and color-blindness revealed that considerably more than half of the males showed hemophilia or color-blindness and the condition is thought to be due to lethal factors linked with normal allelomorphs of the abnormal genes in sex chromosome. Proof of harmful action of weak acids on sperm was also obtained. The previously known condition of heritability of cancer in mice was made much more definite by Little whose F_2 numbers point to 4 independent autosomal genes determining susceptibility, all of which must be simultaneously present. Occurrence of spotted mutants in non-spotted dog breeds is also recorded by Little. BANTA reported that selection for sex-intergradedness in Daphnids was successful. A report on selection for reactivity to light was completed. Banta was also interested in supposed mutative color changes in flounders, 20 per cent of the new year's crop being pigmented on the lower side. BLAKESLEE continued studies on mutation and sexuality in Mucors. In *Portulaca* a dominant vegetative mutation affecting flower color appeared in a part of a white plant. Some cases like that of a purple flower breeding white are deemed to have been periclinal chimeras. In *Datura*, work on the graft-infectious disease "Quercina" has been completed. The mutant "New Species" was found to be tetraploid, i.e., with 24 chromosomes. "Globe" type of mutant seems to be due to 25 chromosomes. HARRIS with others has reported on vascular anatomy of variant bean seedlings; on the physiology of egg production; on properties of vegetable saps and on theory of plot tests. BANKER's study of heredity in a human pedigree of better sort revealed large number of college men. Some lines showed higher percentage than others. DAVENPORT studying twin births found that twinning is due to both father and mother. He completed anthropological studies of American population based on army data. LAUGHLIN has completed a work on eugenical sterilization in the United States and collected data on state institutions for defectives.—James P. Kelly.

1743. DORSEY, M. J. A note on the dropping of flowers in the potato. Jour. Heredity 10: 226-228. Fig. 19. 1919.—On most of the common varieties of potatoes many of the flowers absciss either before the flower opens or before fertilization can take place. In some cases the partially developed seed ball will absciss. Since pollen abortion is very common and occurs in varying percentages, though the flowers develop perfect pistils, and since abscission occurs before tuber formation or the stimulus due to fertilization, it is evident that some other physiological process is active.—J. H. Beaumont.

1744. ELLINGER, TAGE. On the numerical expression of the degree of inbreeding and relationship in a pedigree. Amer. Nat. 54: 540-545. 1 fig. Nov.-Dec., 1920.—The paper gives a modification and some extensions to the system of measuring degrees of inbreeding and relationship published by Dr. RAYMOND PEARL in several articles in the American Naturalist, 1913-1917.—It is attempted first to bring all measurements on the same scale and for that purpose it has been necessary slightly to change the definition of the Coefficient of Relationship, and further to express both the Total Inbreeding Coefficient and the new Total

Relationship Coefficient in areas, using the actual percentage of the maximum area as measure. The new Total Relationship-Inbreeding-Index finally measures—also in areas—the proportion of the total inbreeding in the pedigree of an individual that is due to the relationship between its parents. The full system of measurements is used as an example on the pedigree of the Jersey bull King Melia Rieter 14th.—*Tage Ellinger*.

1745. EMERSON, R. A. Heritable characters of maize. II. Pistillate-flowered maize plants. *Jour. Heredity* 11: 65-76. 8 fig. Feb., 1920.—Description and genetic behavior of two types of terminal inflorescence of maize to which the names "tassel seed" and "tassel ear" have been given. The two types are genetically distinct but further work must be done to determine the exact factorial and linkage relationships. [See also Bot. Absts. 7, Entry 1684.]—*J. H. Beaumont*.

1746. ERNST, A. Über Parthenogenesis und Apogamie. [On parthenogenesis and apogamy.] *Verhandl. Schweiz. Naturf. Ges.* 1919: 1-20. 1919.—See Bot. Absts. 7, Entry 1685.

1747. FAIRCHILD, DAVID. Twins. Their importance as furnishing evidence of the limitations of environment. *Jour. Heredity* 10: 387-396. *Frontispiece, fig. 1-7*. 1919.—A brief philosophical discussion of the value of studies of individuals having identical germ-plasm to determine the importance and limitations of environment as affecting heredity. The author mentions certain of the factors of environment which do not affect heredity but indicates the significance of the work undertaken by the American Genetics Association in the study of photographs and answers to questionnaires submitted by 600 twins.—*J. H. Beaumont*.

1748. FEENSTRA-SLUITER, C. Waarnemingen en Beschouwingen over Bloei Bevruchting en Zaadvorming bij *Cinchona Ledgeriana* Moens. [Observations and considerations of flowering, fertilization and seed formation in *Cinchona Ledgeriana* Moens.] *Mededeel. Kina-Proefsta.* 6. 35 p, 20 fig. 1919.—See Bot. Absts. 7, Entry 1686.

1749. FIRBAS, HEINRICH. Über die Erzeugung von Weizen-Roggenbastardierungen. [The production of wheat-rye hybrids.] *Zeitschr. Pflanzenzücht.* 7: 249-282. Nov., 1920.

1750. FISCHER, H. Kohlensäure und Pflanzenzüchtung. [Carbon dioxide and plant breeding.] *Zeitschr. Pflanzenzücht.* 7: 364-366. Nov., 1920.

1751. FISCHER, H. Orthogenesis, Mutation, Auslese. [Orthogenesis, mutation, selection.] *Naturw. Wochenschr.* 19: 561-566. 1920.

1752. FLEISCHER, B. Über myotonische Dystrophie mit Katarakt. [On myotonic dystrophy with cataract.] *Arch. Ophthalmol.* 96: 1-43. 1918.—See Bot. Absts. 7, Entry 1803.]

1753. FLEISCHER, BRUNO, UND WILLIAM JOSENHANS. Ein Beitrag zur Frage der Vererbung der familiären Sehnervenatrophie (Leberscher Krankheit). [Contribution to the question of the inheritance of familial atrophy of the optic nerve (Leber's disease).] *Arch. Rass. Gesellschaftsbiol.* 13: 129-158. 5 pl. 1920.

1754. FRANCÉ, R. H. Der Parasitismus als schöpferisches Prinzip. [Parasitism as a creative principle.] *Centralbl. Bakt.* 59: 54-64. 6 fig. 1920.—See Bot. Absts. 7, Entry 1799.

1755. FRIMMEL, FR. Über einem Versuch der Züchtung schwarzer Farbentöne an der Gartenprimel. (On an attempt to breed black color-tone in the garden *Primula*.) *Zeitschr. Pflanzenzücht.* 7: 346-356. Nov., 1920.

1756. GATES, R. R. Mutational v. recapitulatory characters. *Rept. British Assoc. Adv. Sci. Bournemouth Meeting 1919*: 340. 1920.—Characters are divided into two classes: Mutations which owe their origin to a nuclear change and modify every stage of the ontogeny, and recapitulatory characters which arise through the impress of environment and usually involve adaptation to new conditions.

These two classes of characters differ in (a) their manner of origin, (b) their relation to organic structure, and (c) their relation to phenomena such as recapitulation, adaptation, distribution, and inheritance. It is held that characters which show recapitulation could not have arisen through mutation, for that would modify every stage instead of adding certain stages as it does. The unsuccessful attempts of many zoologists to explain away the remarkable facts of recapitulation is noted. The apparent contradictions of VON BAER's law of animal development is held to be due partly to the occurrence of mutations in organisms which already show recapitulation.—The author concludes that both types of characters are necessary to account for the phenomena of evolution. The recognition of both types involves the limitation of the cell theory and the admission of the neo-Lamarckian factor.—*J. H. Kempton.*

1757. G[ATES], R. R. Orthogenetic evolution in pigeons. [Rev. of: WHITMAN, CHARLES OTIS. *Posthumous works*. Edited by OSCAR RIDDLE (vol. 3 edited by H. A. CARR). Carnegie Inst. Washington Publ. 257. $x + 194$ p., 88 pl., 36 fig.; 224 p., 39 pl., 11 fig.; xi + 161 p. 1919.] *Nature* 104: 566-568. 1920.

1758. GOODALE, H. D. Concerning the summer plumage of the drake. (Abstract.) *Anat. Rec.* 14: 92-93. 1918.—Some ducks, such as the Gray Call, Mallard, and Rouen, molt early in the summer (June). The new plumage, called summer plumage, is entirely unlike the old, since it strongly resembles that of the female. If the testes of the male are completely removed, the change in color no longer occurs, although the birds molt. Further studies of the problem show that, potentially, the change in color of the intact male takes place 2 or 3 months prior to the actual change, for the potential change, at will, may be rendered actual by removing feathers and thus inducing a growth of new ones. The new feathers that come in late in the winter are like the old, but those pulled a little later (March) are like the summer plumage. This change coincides approximately with the beginning of manifestations of sexual activity.—It has also been found that about the time the summer plumage reaches its height, sexual activity diminishes or disappears. At this time the reproductive system of the male contains few or no spermatozoa. The summer plumage no sooner reaches its height than the change back to the breeding plumage begins.—It is apparent, therefore, that the summer plumage develops coincidentally with the period of greatest activity of the testes, while the breeding plumage, so-called, develops during the quiescent period.—The histological changes in the testes are being examined.—*H. D. Goodale.*

1759. GOWEN, JOHN W. Conformation and its relation to milk-producing capacity in Jersey cattle. *Jour. Dairy Sci.* 3: 1-32. 1 fig. Jan., 1920.—A biometric analysis of the relation between conformation and milk production in 1674 Jersey cows entered in the Registry of Merit. The data on conformation are the detailed and total scores of about 140 judges, collected by the Secretary of the Jersey Cattle Club. The average total score of these cows was 89.8 where 100 represents the ideal type. Among the elements of conformation, those pertaining to the mammary system showed most room for improvement. This same group of characteristics was also the most variable. The correlation between total score and milk yield for a year was $+0.194 \pm 0.016$. Aside from total score the best indications of high yield were found to be large, tortuous, and elastic milk veins ($+0.191$); udder large and not fleshy ($+0.191$); rear udder well rounded out and well out and up behind ($+0.171$); body, wedge shape, with deep large paunch, legs proportionate to size and fine quality ($+0.166$); and general appearance ($+0.115$). Ten other elements in the score dealing with conformation of thighs, rump, fore udder, teats, head, tail, general shape of udder, size, hip bones and neck showed correlations with milk yield ranging from $+0.089$ to $+0.030$ which were probably significant. There were positive but insignificant correlations in the case of eyes, horns and muzzle and lung capacity as indicated by depth and breadth through body just back of fore legs. The only negative correlation was in the case of straight back (-0.070 ± 0.017). It is pointed out that other data show correlations between a seven day test and year milk yield $2\frac{1}{2}$ times as great as that between total score and year milk yield, proving that even a short test of actual production is much superior to any judgment based on conformation.—*Sewall Wright.*

1760. HAECKER, V. Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung. [On further correlations in the field of Mendelian investigation.] Pflüger's Arch. Gesamte Physiol. 181: 149-169. 1920.

1761. HANSEN, W. Die Mahndorfer Pflanzenzüchtung bzw. das Mahndorfer Usancenbuch. [The Mahndorf plant-breeding or the book of Mahndorf methods.] Zeitschr. Pflanzenzücht. 7: 283-318. 5 fig. Nov., 1920.

1762. HARLAND, S. C. Inheritance in *Dolichos lablab*, L. Part I. Jour. Genetics 10: 219-226. Oct., 1920.—Two white-flowered varieties of the bonavist were crossed. The anthers open before the flowers, and bagging was therefore omitted. The character of indefinite growth was proved a Mendelian dominant to the bush habit. One variety had no visible anthocyan; the other had purple in the seed-coat and hairs of the stipules. F_1 had purple flowers, nodes, and leaf-ribs, with black seeds. In F_2 the ratio by flower-color was 9:7, as was confirmed in subsequent generations. By seed-color, the ratio in F_2 was 9:3:4.—*John Belling*.

1763. HARMAN, MARY T. Chromosome studies in Tettigidae. II. Chromosomes of Paratettix BB and CC and their hybrid BC. Biol. Bull. 38: 213-230. 3 pl. April, 1920.—Cytological observations on spermatogenesis in grouse locusts used by R. K. NABOURS in genetical work. Chromosomes of form BB are like those of CC except that one pair ("the third pair") is hook-shaped instead of straight. Hybrid BC has one hooked and one straight chromosome in third pair. Author describes end-to-end union of chromosomes with "not . . . the least appearance of a side-by-side pairing" in growth period. Believes lack of crossing over in *Paratettix* is explained by absence of parasynapsis. Suggests that in *Apo-tettix* where crossing over occurs parasynapsis may occur.—*C. W. Metz*.

1764. HART, C. Über die Vererbung erworbener Eigenschaften. [On the inheritance of acquired characters.] Berlin. Klin. Wochenschr. 57: 654-656. 1920.

1765. HAYES, H. K., AND HARRY V. HARLAN. The inheritance of the length of internode in the rachis of the barley spike. U. S. Dept. Agric. Bull. 869. 26 p., 2 pl., 2 fig. Sept. 30, 1920.—Extensive data bearing on the inheritance of length of rachis internode in crosses between pure lines of barley is given. Four dense and six lax or semi-lax sorts were used. In F_1 density is dominant or semi-dominant. In F_2 the range of variability includes the modal class of both parents. In F_3 homozygous strains were isolated similar to either parent. In three crosses types homozygous for intermediate densities were also obtained. The author interprets his results on the factor basis, assuming one, two, or more factors as the specific cases warrant. The significance of the constancy of internode length as an aid to barley classification is noted.—*F. P. Bussell*.

1766. HAYES, H. K., JOHN H. PARKER, AND CARL KURTZWEIL. Genetics of rust resistance in crosses of varieties of *Triticum vulgare* with varieties of *T. durum* and *T. dicoccum*. Jour. Agric. Res. 19: 532-542. 6 pl. Sept., 1920.—Inheritance studies are reported on rust resistance as correlated with certain botanical and morphological characters in crosses between common wheats and resistant pure-line strains of durum and emmer. Earlier work presented difficulties of interpretation due to the presence of different biologic strains of rust. Parent strains of wheat together with F_2 and F_3 generation material were inoculated with a pure strain of *Puccinia graminis tritici*. The durum \times common cross gave susceptible F_1 , while emmer \times common showed resistance partially dominant, therefore, reciprocal crosses behaved similarly. There was some indication of linkage between both durum and emmer head characters and resistance to rust infection. A few crossovers giving resistant common-wheat types were obtained. The mode of inheritance of rust resistance is interpreted as Mendelian.—*F. P. Bussell*.

1767. HERLANT, MAURICE. Un cas d'hermaphrodisme complet et fonctionnel chez *Paracentrotus lividus*. [A case of complete and functional hermaphroditism in *Paracentrotus*

lividus.] Arch. Zool. Exp. Notes et Rev. 57: 28-31. 1 fig. 1918.—Specimen of this sea urchin had three normal testes, one atrophied testis, and large mixed gland. Functional eggs and spermatozoa from mixed gland united in self-fertilization, and from the fertilized eggs normal plutei developed. Eggs of this hermaphrodite also united normally with spermatozoa of normal males, and its spermatozoa fertilized eggs of normal females. Atrophied testis contained parasite, but there was nothing to indicate that hermaphroditism depended on parasitism.—A. Franklin Shull.

1768. HILDÉN, K. Anthropologische Untersuchungen über die Eingeborenen des russischen Altai. [Anthropological investigations on the natives of the Russian Altai.] 137 p. Helsingfors, 1920.

1769. HOGBEN, LANCELOT T. Studies on synapsis II. Parallel conjugation and the prophase complex in *Periplaneta* with special reference to the premeiotic telophase. Proc. Roy. Soc. London 91: 305-329. 3 pl. Aug. 7, 1920.—Author studied spermatogenesis and oogenesis in *Periplaneta* (cockroach); first account of the latter. Author does not observe anaphase chromosomes of the late oogonia to be split, in contrast to this condition observed by Miss DIGBY in the premeiotic anaphase chromosomes of *Osmunda*. There are thirty-two autosomes and two accessory chromosomes in the female, one accessory in the male. Parasygnapsis occurs in both sexes; in the female the accessories and autosomes do not behave differently. He observes no twisting filaments in the zygotene stage and believes that the union of the constituent halves of this stage is sufficiently intimate to allow the possibility of crossing over but not by such means as are postulated by the chiasmatype theory. In oogenesis segregation of homologous chromosomes appears to take place in the first maturation division, but has no data to indicate that this occurs in spermatogenesis.—C. L. Parmenter.

1770. HOVASSE, R. Le nombre des chromosomes chez les têtards parthénogénétique de grenouille. [The number of chromosomes in parthenogenetic tadpoles of the frog.] Compt. Rend. Acad. Sci. Paris 170: 1211-1216. May, 1920.—The author has determined the approximate number of chromosomes in the cells of parthenogenetic tadpoles and gastrulae of *Rana temporaria*. In two tadpoles, aged 50 and 80 days, the number is diploid (24-27) which he interprets as being produced by regulation (DELAGE), a doubling of the chromosome number very early, perhaps at the beginning of segmentation. In two gastrulae, 8 days old, the number varies from approximately 15 to 28 and the size of the nuclei varies accordingly from 5 to 16 microns in diameter. These numbers he interprets as due to regulation in only a part of the cells. The number of chromosomes in the cells of seven sickly tadpoles, aged 16 days and less, is haploid, and the nuclei are about half normal size. These conditions are cited as very comparable to those obtained by DRIESCH in parthenogenetic sea-urchin embryos. DELAGE adds a note emphasizing these data as confirming his regulation theory.—C. L. Parmenter.

1771. HOWE, LUCIEN. The relation of hereditary eye defects to genetics and eugenics. Jour. Heredity 10: 379-382. Nov., 1919.—Pointing out the attitude which the ophthalmologist must take in regard to hereditary blindness and showing that sterilization or sequestration of carriers of the defect is legal in some states.—J. H. Beaumont.

1772. HUME, A. N. A system for breeding corn or gregarious animals. Jour. Heredity 11: 191-192. April, 1920.—A brief description of a plan for breeding and selection which is fully outlined in South Dakota Experiment Station Bulletin 186 (Bot. Absts. 5, Entry 1532). The plan consists in introducing ears from outside the breeding-plot into the even-numbered detasseled rows, which gives opportunity for testing the yielding power of such introductions before permitting them to contaminate the other "blood lines." The system is especially applicable to poultry where 4 or more pens are used and accurate egg-laying records are kept.—J. H. Beaumont.

1773. JABLONSKI, WALTER. Über Albinismus des Auges im Zusammenhang mit den Vererbungsregeln. [On albinism of the eye in connection with inheritance laws.] Deutsch. Med. Wochenschr. 46: 708-711. 1920.

1774. JELINEK. *Nächste Aufgaben der Pflanzenzüchtung und der Sortenprüfung.* [The next problems of plant-breeding and variety testing.] *Zeitschr. Pflanzenzücht.* 7: 83-90. Dec., 1919.—It has been shown that a variety (of wheat) selected as pure line may show great variations in yield in different years and it has been proposed to mix selected pure lines to secure varieties better than either single pure line or original "Landsorten." Increased yield due to individual reaction of variety or its components to various vegetative factors. This capacity to react differs among various lines of a variety and is hereditary. Relation of inherent reaction to vegetative factors may be shown graphically by Stempel type of "correlation curve." Limiting values which indicate range of correlation curve and which form limiting conditions of existence for variety are called "vegetation limits" of variety or line. The "renting capacity" of variety is conditioned by limiting minimum and maximum values of vegetation factors, defined by harvest value and its production costs. "Renting capacity" is necessarily not constant. Lines with narrow vegetation limits have also narrow renting capacities but lines with broad vegetation limits may have narrow or broad renting capacity according to whether the correlation curve rises and falls quickly or gradually at either end. Limits between which vegetative factors of locality vary relatively to soil and varying weather condition in any year are termed "vegetation limits of the locality." Varieties with narrow correlation curve react very easily to changes of growth conditions and may be designated as irritable varieties; and conversely, plastic varieties exist. In selecting varieties for any locality care should be taken that varietal renting capacity is not narrower than vegetation limits of given region. Sufficient plasticity of any variety is important in agricultural practice, especially where growth conditions vary widely. Pure lines are necessarily non-plastic. If highest type variety is to consist of selected mixture ("individually selected population") of pure lines, then parent variety must be preserved in original condition. Certain difficulties would attend formation of proper mixture of lines but these should not be considered insuperable.—*L. R. Waldron.*

1775. JOHNSON, CHARLES W. *Variation of the palm weevil.* *Jour. Heredity* 11: 84. 1 fig. 1920.—Palm weevils (*Rhynchophorus cruentus* Fabr.) were collected showing practically continuous color intergradations.—*J. H. Beaumont.*

1776. JOHNSON, JAMES. *An improved strain of Wisconsin tobacco. Connecticut Havana No. 38.* *Jour. Heredity* 10: 281-288. Fig. 8-10. June, 1919.—Seed from about thirty-five self-fertilized plants of Connecticut Havana tobacco were sown in progeny rows and it became evident that three types were represented in the progeny. Two types differed from the normal and were constant in later generations. They are undoubtedly mutations. A cross between these gave an intermediate which in two years and among large numbers did not segregate, though exact data were not taken. Seed was distributed and in 1919 it has displaced other strains of tobacco. [See also Bot. Absts. 7, Entry 1694.]-*J. H. Beaumont.*

1777. JONES, D. F. *The effect of inbreeding and crossbreeding upon development.* *Proc. Nation. Acad. Sci.* 4: 246-250. 2 fig. Aug., 1918.—Continuing inbreeding experiments of EAST and HAYES, author finds no further reduction in vigor after eight inbred generations. Two inbred lines, though less productive than original parents, are still quite fertile; others have run towards either pollen or ovule abortion. Crossing different inbred lines enormously increases vigor, frequently bringing gain in yield of 180 per cent. Mixtures of own and foreign pollen, applied to silks of both parents, result in selective fertilization favoring own pollen.—*Merle C. Coulter.*

1778. JONES, D. F. *Heritable characters of maize. IV. A lethal factor—defective seeds.* *Jour. Heredity* 11: 161-167. 7 fig. April, 1920.—A factor, development of pericarp but incomplete development or complete suppression of embryo and endosperm, is to be distinguished from partially developed ovules due to incompleting growth or ineffective fertilization. If genetically defective seeds appear on a self-fertilized plant they will be in approximately the ratio 3:1. Several other factors may be operating, however, so that much more work must be done to check up the inheritance of this factor.—*J. H. Beaumont.*

1779. JONES, D. F. Sterility in animals and plants. *Sci. Amer. Monthly* 2: 117-119. 7 fig. 1920.—Hereditary lethal factors, when received from both parents, prevent development of offspring.—*Chas. H. Otis.*

1780. JONES, D. F. Segregation of susceptibility of parasitism in maize. *Amer. Jour. Bot.* 5: 295-300. June, 1918.—Segregates from long-inbred maize show striking differences in susceptibility to corn smut and an unidentified leaf blight. Crosses with resistant strains give approximately resistant F_1 and segregation again in F_2 . Indicates susceptibility commonly recessive, being segregated in some lines and not in others. Supports his earlier hypothesis that increased development shown by hybrids is due to conjunctive action of large number of favorable, dominant growth factors contributed by both parents.—*Merle C. Coulter.*

1781. JONES, D. F., AND W. O. FILLEY. Teas' hybrid *Catalpa*. *Jour. Heredity* 11: 16-24. 6 fig. 1920.—J. C. TEAS, of Carthage, Missouri, grew seed of *Catalpa Kaempferi* which was growing near the two North American species *C. bignonioides* and *C. speciosa* and obtained a vigorous-growing hybrid. The parentage has been established by Dr. E. M. EAST and H. K. HAYS who made the back-cross *C. bignonioides* \times *C. Kaempferi* and obtained a similar hybrid. These hybrids are more hardy and more rapid-growing than either parent but are intermediate in most of the fruit, flower and tree characters which add, however, to its value as an ornamental.—*J. H. Beaumont.*

1782. JORDAN, DAVID STARR. War and genetic values. *Jour. Heredity* 10: 223-225. May, 1919.—A denunciation of the theories of Dr. McFIE, Dr. THORSTEIN VEBLEN, and others, who contend that war does not affect the eugenic level of a race or nation. The writer contends that war does remove many of the higher intellects and combined with the corollary losses due to war is detrimental to the moral and intellectual status of the nation. His theme is: "Restoration in quantity is a matter of time, but restoration in quality, in values, moral, mental, and physical, will be a much longer and more difficult process."—*J. H. Beaumont.*

1783. KALT, B. Die Hintertuxergerste. Ein Anbau- und Züchtungsversuch. [Hintertux barley. A cultural and breeding experiment.] *Küln-Arch.* 7: 217-240. 1918.—Author reports observations on a barley raised from seed grain secured from station of 1500 m. altitude. Plants proved a very early-maturing form of *Hordeum distichum nutans* having long stem, long, open, heavy heads, long, heavy grain, little tillering (Bestockung), and high nitrogen content. Last two characteristics considered not desirable. It is now planned by breeding to increase tillering in this barley without decreasing earliness, and to lower nitrogen content. [From anonymous review in *Zeitschr. Pflanzenzücht.* 7: 39-40. June, 1919.]—*James P. Kelly.*

1784. KAMMERER, PAUL. Dunkeltiere im Licht und Lichttiere im Dunkel. [Darkness animals in light and light animals in darkness.] *Naturwissenschaften* 8: 28-35. 5 fig. 1920.—Reviews and spiritedly defends against critics his interpretation of results of experiments published in 1912. The Austrian cave salamander, *Proteus*, normally has a small eye which in the adult is about double in size that of the young but the overlying thick skin contains the usual glands, sense organs, and slime cells and renders the eye difficult to find. The lens cells undergo some degeneration. Twenty-three young, born and reared in a cistern at the Vienna station, had distinct but very small eyes. In daylight the skin becomes black but the eyes are really in darkness under the skin. Only such light, e.g., that from a red incandescent bulb, as does not cause pigment development, will continue to illuminate the eye fully. Author exposed one *Proteus* five years to a red incandescent light and five individuals alternately to red light and daylight. The latter developed some pigment but not enough to shield the eyes from light. Figure of one of these individuals shows a prominent eye. Lens in one subjected to red light was 18 times longer and $12\frac{1}{2}$ times wider than in normal; lens fibers attached to ciliary body; a true cornea and iris with pupil; skin over eye thin, transparent, and lacking in glands, etc. The eye stands out like a glass ball and has the

retina well developed. "Light *Proteus*" see, as proved by feeding experiments with earthworms in outer tank while *Proteus* was confined in an inner glass tank without water connection. No attempt was made to get offspring in darkness from the large-eyed *Proteus*, though the author scarcely doubted that positive results would have been obtained; he however despaired of contributing anything new to solution of problem of inheritance of acquired characters.—Author cites many cases which he holds bear upon the effect of cave environment upon organisms and does not doubt that their modifications are hereditary effects of environmental influences. In reply to his critics regarding the possibility that the individuals with large eyes represented genetically different material, the author states that the 6 reared in red light alone developed the large eyes while 40 others of the same material reared in darkness did not do so.—A. M. Banta.

1785. KEITH, A. **The mathematician as an anatomist.** [Rev. of: PEARSON, KARL, AND JULIA BELL. **A study of the long bones of the English skeleton.** Department of applied statistics. University of London, University College: Drapers Company research memoirs, Biometric series, 10. *Text pt. 1*, v + 224 p.; *Atlas pt. 1*, vii + 59 pl., + tables. 11. *Text pt. 1*, sec. 2, 225–539; *atlas pt. 1*, sec. 2, vii + pl. 60–101 + tables. University Press: Cambridge, 1919.] *Nature* 105: 767–770. 1920.—Reviewer has been collecting data from all systems of the Primate body (see *Nature* 75: 508. 1911). His results are, in the main, in harmony with those of Pearson. We lack data regarding possible correlation of individualities in the human gait with structural variations of the thigh bone.—O. A. Stevens.

1786. KELLY, JAMES P. **A genetical study of flower form and flower color in *Phlox Drummondii*.** *Genetics* 5: 189–248. 2 colored pl., 13 fig. Mar., 1920.—Reference is made to investigations of GILBERT (*Jour. Agric. Res.* 4: 293–302. 1915) who carried three crosses through the F_2 generation and assumed five factors to explain his observations.—Author finds that variety *cuspidata* having deeply incised petals is a simple Mendelian recessive to varieties having entire petals; that so-called variety *fimbriata* is a "monoheterozygote of the entire and *cuspidata* types" and hence is unfixable; that color in the petals of *fimbriata* and *cuspidata* types is confined to the papillated epidermal cells which do not completely cover the mesoderm.—Funnel-shaped corolla is a simple recessive to salver-shaped corolla.—Crossing of strains A and B, both of which have white flower-blades, and of strains A and J, the former having white flower-blades and the latter light pink, gave in each case a different full-colored F_1 type. F_1 of strains $A \times B$ proved heterozygous for *P*, a chromogen factor, *E*, an enzyme factor, and *A*, an activator for *E*, these factors being necessary for blade color. Type of blade color varies according to nature of chromogen base. Action of *E* and *A* on *P* produces a full-colored blade; on *D*, a different chromogen base, gives both stippled and unstippled blades; on *R*, a third chromogen base, gives a different blade color. In AB and EF series interaction of chromogen bases *P* and *D* together with *E* and *A* gives a distinct full-colored type. Similarly in AJ series blade color due to factors *REA* + color due to *DEA* gives a distinct full-colored type. In AB and EF series a bluing factor (or linked factors), which is independent of the essential blade-color factors, doubles the number of color types and modifies the reddish blade color to a bluish color. Dark-eyed and light-eyed forms differ by a single factor. In some cases this factor intensifies blade color. Cream-colored blade is a simple recessive to white blade. Author reports fourteen chromosomes in somatic cells of *Phlox Drummondii*.—Ernest Dorsey.

1787. KEMPTON, J. H. **Heritable characters of maize. III. Brachytic culms.** *Jour. Heredity* 11: 111–115. 4 fig. Mar., 1920.—The character appeared in a Chinese-Algerian hybrid "Dh 416" and consists of a shortening of the internodes on the main culm without a corresponding reduction in number or in size of other organs. The character behaves as a simple Mendelian recessive. Brachytic variations are found in "bush" peas, beans, squashes and tomatoes and are to be distinguished from dwarfing. Author cites two other cases of brachytic variation neither of which bred true; one segregated in a normal frequency curve in F_2 , while the other gave only a few brachytic plants. [See also Bot. Absts. 7, Entry 1696.] —J. H. Beaumont.

1788. KLEBAHN, H. Impfversuche mit Pfropfbastarden. [Infection experiments with graft hybrids.] *Flora* 111-112: 418-430. 1918.—See Bot. Absts. 7, Entry 1800.

1789. KOLTONŠKI, HERMANN. Über Erbllichkeit der Ovarial-, besonders der Dermoid-cysten. [On the inheritance of ovarian cysts, especially the dermoid cysts.] *Zeitschr. Krebsforsch.* 17: 408-416. 1920.

1790. KOTOWSKI, FELIKS. Zmienneść i Korrelacje w "czystej linii" pszenicy. Tr. vulgare Ostka biała dublańska. [Correlation and variability in a pure line of wheat.] *Polnisch: Tygodnika Rolniczy*, Krakau 1919.—See Bot. Absts. 7, Entry 1702.

1791. KUTTNER, O. [German rev. of: WOLTERECK, RICH. Variation und Artbildung. Analytische und experimentelle Untersuchungen an pelagischen Daphniden und anderen Cladoceren. Erster Teil: Morphologische, entwicklungsgeschichtliche und physiologische Variations-Analyse. (Variation and species formation. Analytical experimental studies on pelagic Daphnias and other Cladocera. Part I. Analysis of morphological, embryological, and physiological variation.) 145 p., 6 pl., 55 fig. Bern, 1919.] *Zeitschr. Indukt. Abstamm. u. Vererb.* 24: 179-182. Sept., 1920.

1792. LAUGHLIN, HARRY H. Calculating ancestral influences in man. A mathematical measure of the demonstrated facts of bisexual heredity. *Proc. Nation. Acad. Sci. [U.S.]* 6: 235-242. 2 charts. May, 1920.—An abstract of a more extensive discussion not yet published. "The principles set forth" in the larger paper, "make possible the mathematical formulation of an indefinitely great number of complex situations in reference to ancestral influence," of which twenty-seven formulae have been developed. The application of eight of these to the first five ancestral generations in man have been worked out and charted. The present abstract reproduces the eight formulae with accompanying charts showing the result of their application to the first three ancestral generations of man.—The calculations are based on the assumption of 24 somatic chromosomes with sexual heterozygosity in the male and without provision for mutation, crossing over, etc., as such special phenomena are not yet measurable in man and the "present formulae will not be upset by such corrections" when later introduced. The formulae as set forth are foundational and are stated in general terms applicable to all forms of bisexual heredity.—Howard J. Banker.

1793. LAUGHLIN, HARRY H. Population schedule for the census of 1920. *Jour. Heredity* 10: 208-210. 1919.—A proposed addition by eugenists and genealogists to the general enumeration of the census which would record the name of the father and the maiden name of the mother of every person enumerated. This would permit analysis of census returns on the personal and family-history basis. The reasons and benefits for such enumerations are given as stated and unanimously adopted by the Eugenics Research Association.—J. H. Beaumont.

1794. LAURIE, D. F. Evolution, heredity and breeding. *Jour. Dept. Agric. South Australia* 23: 692-697. 1920.—The writer emphasizes the importance to workers in heredity of the investigations of biochemists. He cites MORGAN's castration experiments on Seabright cocks as indicating that the Mendelian "factor" inhibiting the appearance of a character is located in the testes and due to hormonal influence. Luteal cells are present in the testes of the hen-feathered cocks. He quotes the address of Professor A. KERH at the British Association at Bournemouth (*Nature*, Nov. 13, 1919) in which the predominance of certain distinctive features of the three types,—European, Chinaman, and Negro—are attributed to the influence of the organs of internal secretion. "If the selective action of *alpha* proteins in food in regard to the activity or repression of the organs of internal secretion which are known to affect growth, and normal or abnormal developments, is ultimately proved, then Mendelians are faced with a difficult position in regard to the continuity of the germ-plasm. Nothing can be added. On the other hand, BATESON's view of the shedding of inhibiting factors may not be affected, because, except in pathological or post-operative conditions, the factor would not be influenced by immediate endocrinal action."—A. F. Chidester.

1795. LEAKE, H. MARTIN, AND B. RAM PERSHAD. A preliminary note on the flower colour and associated characters of the opium poppy. *Jour. Genetics* 10: 1-20. 1 pl. July, 1920.—On basis of color and its distribution authors arrange Indian poppies in five groups: (1) *White-eyed group*, due to two factors *P* and *R*. *P* alone determines pink margin to petal and lacks dominance, giving light pink heterozygotes. *R* is intensifier of *P* and in absence of latter gives no visible results. Factor *R* possesses dominance but its results are deep or light depending on duplex or simplex condition of *P*. (2) *Purple group*, dependent on presence of genes *M* and *L* and absence of *P*. *M* shows complete dominance and develops mauve purple in margin with a deeper eye. *L* intensifies results of *M* giving magentas. (3) *Dilute color group*, where *P* and *M* are present and *L* absent. *R* is inhibited in presence of *M*. Marginal color is dilute and eye colored. (4) *Full color group*, factorially like last but with *L* in addition. Two of subsidiary variations within this group dependent on homo- or heterozygosity of *P* as was true also of third group. (5) *White-flowered group*, whose genetic diversity is mentioned. The securing of extracted whites from two pure [homozygous] colored plants points to two independent anthocyan bases.—Factor *P* is correlated with short vegetative period. Groups 1 and 5 are white-seeded, while 2, 3, and 4 have colored seeds. Laciniated petal is simple dominant to entire petal. Small, more or less sepaloid petals seemed a simple recessive.—James P. Kelly.

1796. LEHMANN, ERNST. Variabilität und Blütenmorphologie. [Variability and floral morphology.] *Biol. Zentralbl.* 38: 1-38. Jan., 1918.—Author reviews literature (120 titles in list) relating to morphology and variability of flower beginning with LINNÆUS who emphasized the typical, outlawed large variations, labelling them as monstrous or teratological, and ignored small variations. GOETHE's plea that normal and abnormal be treated together is given prominence. DE CANDOLLE and VON MOHL are cited as agreeing with GOETHE. Author points out looseness of usage of terms *monstrosity* and *deformity* and approves STENZEL's substitution of *deviation*, *abnormality*, and *anomaly*. In case of last two terms further analysis was made possible especially by VÖCHTING who introduced a statistical treatment. Now a relatively infrequent case that fits into a Gaussian distribution is named, following KLEBS, simply a *variation* just as are narrower and commoner deviations. Author surveys applications that have been made of statistical methods to flowers. Originally numerical evaluation limited to type [mode]. COCKERELL, BURKILL, and LUDWIG were among first to use mean. DE VRIES did pioneer work on character of curves of distribution. VERSCHAFFELT first directed attention to degree of variability in floral cycles using the quartile, but later many authors used σ . Much has been done on causes of floral variation: soil conditions, light, temperature, heredity, age of plant. Lastly, correlation is treated, especially work on Crassulaceae by KLEBS, on *Ficaria*, Paris, and *Parnassia*.—James P. Kelly.

1797. LEIGHTY, CLYDE E. Natural wheat-rye hybrids of 1918. *Jour. Heredity* 11: 129-136. Fig. 19-22. Mar., 1920.—Hybrids between wheat and rye are rare but in 1918 nineteen instances were found at Arlington Farm and three at the Virginia Agricultural Experiment Station. It is evident from a comparative analysis of the plants that they are hybrids of wheat as the female parent and rye. The hybrids are one to five per cent fertile and some F_2 generation plants are being grown. [See also Bot. Absts. 7, Entry 1703].—J. H. Beaumont.

1798. VAN DER LEK. [Dutch rev. of: FISCHER, ED. Der Speziesbegriff und die Frage der Spezies-Entstehung bei den parasitischen Pilzen. (The species concept and the question of the origin of species in the parasitic fungi.) Verhandl. Schweiz. Naturf. Ges. 98 Jahresversammlung.] *Genetica* 2: 459-462. Sept., 1920.

1799. VAN DER LEK. [Dutch rev. of: FRANCÉ, R. H. Der Parasitismus als schöpferisches Prinzip. (Parasitism as a creative principle.) Centralbl. Bakt. 59: 54-64. 6 fig. 1920.] *Genetica* 2: 462-464. Sept., 1920.

1800. VAN DER LEK. [Dutch rev. of: KLEBAHN, H. Impfversuche mit Pfropfbastarden. (Infection experiments with graft hybrids.) *Flora* 11/12: 418-430. 1918. (See Bot. Absts. 3, Entry 2124; 4, Entry 3512.)] *Genetica* 2: 468-471. Sept., 1920.

1801. VAN DER LEK. [Dutch rev. of: TISDALE, W. H. A study of the nature and inheritance of wilt resistance. Jour. Agric. Res. 11: 573-603. 3 pl., 8 fig. 1917.] *Genetica* 2: 478-480. Sept., 1920.

1802. LENZ, FRITZ. Oskar Hertwigs Angriff gegen den "Darwinismus" und die Rassenhygiene. [Oskar Hertwig's attack on Darwinism and race hygiene.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 194-203. 1920.

1803. LENZ. [German rev. of: FLEISCHER, B. Über myotonische Dystrophie mit Katarakt. (On myotonic dystrophy with cataract.) *Arch. Ophthalmol.* 96: 1-43. 1918.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 208. 1920.

1804. LENZ. [German rev. of: SCHALLMAYER, W. Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst. (Heredity and selection. Fundamentals of social biology and science of race improvement.) 3rd ed., 8 vo, xvi + 536 p. Gustav Fischer: Jena, 1918. (See Bot. Absts. 2, Entry 704.)] *Zeitschr. Indukt. Abstamm. u. Vererb.* 24: 297-300. Nov., 1920.

1805. LENZ. [German rev. of: SIEGEL, P. W. Gewollte und ungewollte Schwankungen der weiblichen Fruchtbarkeit. Bedeutung des Kohabitationstermines für die Häufigkeit der Knabengeburt. (Intentional and unintentional variations in female fecundity. Significance of the time of intercourse for the frequency of male births.) 197 p. J. Springer: Berlin, 1917.] *Arch. Rass.-u. Gesellschaftsbiol.* 13: 221-225. 1920.

1806. LEVERENZ, C. Die meistgebaute landwirtschaftlichen Pflanzenzüchten Deutschlands mit Ausnahme der Kartoffeln. (The most frequently cultivated agricultural plant breeds of Germany, with exception of potatoes.) *Landwirtschaftskammer Provinz Sachsen.* 79 p. Hermann Kuhnt: Halle, 1920.—See Bot. Absts. 7, Entry 1704.

1807. LEVY, FRITZ. Die Kernverhältnisse bei parthenogenetischen Fröschen. Ein Beitrag zur Physiologie und Pathologie der Zelle. [The nuclear relations in parthenogenetic frogs. A contribution to the physiology and pathology of the cell.] *Sitzungsber. Preuss. Akad. Wiss. Berlin* 1920: 417-425. 1920.

1808. LITTLE, C. C. A note on the origin of piebald spotting in dogs. *Jour. Heredity* 11: 12-15. 1 fig. 1920.—Piebald spotting may be altered in extent by selection within a race showing a minute degree of spotting, but since the factor is hypostatic it will not appear in a self-colored race unless by recombination or mutation. Two cases, a spotted Scottish terrier puppy and spotted puppies in two litters of Airedale terriers, are given with their pedigrees, with an explanation of which of the parents may have been responsible in bringing in the hypostatic factor.—J. H. Beaumont.

1809. LOTSY, J. P. Over *Gallus temminckii* G. R. Gray en over de eikleur der wilde Hoenderlinneonten. [*Gallus temminckii* G. R. Gray and the egg color of the wild Linnean species of fowl.] *Genetica* 2: 400-404. 1 fig. Sept., 1920.

1810. LUBOSCH, WILHELM. Das Problem der tierischen Genealogie. Nebst einer Erörterung des genealogischen Zusammenhanges der Steinheimer Schnecken. [The problem of animal genealogy. Also a statement of the genealogical relations of the Steinheim snails.] *Arch. Mikrosk. Anat.* 94: 459-499. 1920.

1811. LÜHNING. Die erbliche Geschlechtsverknüpfung. [Hereditary sex-determination.] *Deutsch. Landw. Tierzüchtg.* 22: 77-78. 1918.—Author argues that the sex of offspring is determined by that of the weaker of the parents as the race would become extinct if the reverse were true. He holds that in general offspring inherit their characteristics largely from the parent of the opposite sex. Inheritance of thick lower lip of the Habsburgs is discussed briefly as illustration.—Sewall Wright.

1812. MACLEOD, J. *The quantitative method in biology.* 15 × 23 cm., v + 228 p., 27 fig. Longmans, Green & Co.: New York, 1919.—The thesis taken by the author is that all classified groups, species, etc.; all variation, Mendelian or otherwise; in fact all biological phenomena, should be measured and reduced to constants, similar to those of the physicist. These constants will then form the basis of exact description necessary to further biological progress.—Up to the present, the great variation of biological phenomena has barred the application of this method. Preliminary study of the specimen reveals certain *primordia*, or simple elementary properties of characters, which are to be measured in order to find the constants mentioned above. The *primordia* for each subject are to be determined independently by preliminary study.—The rest of the book is given over to expansion and illustration of this thesis. Discussion of quantitative methods is merely a side issue, only the simplest of them being used for illustration purposes. [See also Bot. Absts. 4, Entries 758, 3528].—*John W. Gowen.*

1813. MATTHEWS, J. R. *Hybridism and classification in the genus Rosa.* New Phytol. 19: 153-171. July-Oct., 1920.—Classification of roses is complicated by natural hybridization, for which there is abundant opportunity. A number of *Rosa* species are now acknowledged hybrids due to their intermediateness. Others are suggested by sterility, on basis of JEFFREY's "cryptohybrid" principle. Author classifies genus in 5 sections and 18 groups. Members of each group differ in only a few unit characters. For each group author uses some or all of the following unit characters, and shows that majority of combinations theoretically possible have already been recognized and usually given specific names: hairy vs. glabrous leaflets (*Hh*); biserrate vs. not biserrate (*Bb*); presence vs. absence of foliar glands (*Gg*); hispid vs. smooth peduncles (*Ss*). Believes morphological methods alone insufficient for solution of problems involved; emphasizes need of breeding work, upon which new classification should be based, involving return "to the Linnean conception of the species, denoting its various combinations by some purely symbolical method."—*Merle C. Coulter.*

1814. MERRIMAN, MABEL L. *Studies in the conjugation of Spirogyra ternata.* Bull. Torrey Bot. Club 47: 9-20. 3 fig. January, 1920.—Records differences in form and volume of male and female gametangia in *S. ternata*. Suggests that differences may be due to differences in metabolism.—*E. N. Transeau.*

1815. O'NEAL, C. E. *Microsporogenesis in Datura stramonium.* Bull. Torrey Bot. Club 47: 231-241. 2 pl. 1920.—The maturation stages are found in anthers 2 to 4 mm. long. The diameter of the pollen-mother-cells in the resting stage is about 25 microns. Synzesis is figured. Doubleness of the spireme thread was visible before its segmentation. Twelve bivalents were counted, and no differences in shape or size were made out. In the spindles of the second division the chromosomes are evenly spaced, and have "an almost diagrammatic appearance." [See Bot. Absts. 6, Entry 1001].—*John Belling.*

1816. ORBAN, G. *Untersuchungen über die Sexualität von Phycomyces nitens.* [Sexuality of *Phycomyces nitens*.] Beih. Bot. Centralbl. 36: 1-59. 2 pl., 20 fig. 1919.—Author attempts to make a more thorough investigation of processes of sexual reproduction already known in *Phycomyces nitens*. The sexes are distinguished by secondary sexual characters which are constant for all (+) and (−) races, even for those obtained by germination of zygospores. Cultural conditions influencing strength of zygosporic line between heterothallic races are investigated. Homothallic mycelia are studied in detail in regard to production of pseudophores, formation of zygospores entirely from homothallic filaments or jointly from homothallic and heterothallic filaments, formation of azygospores and sporangia and changes in sexual reaction from homothallic to heterothallic. On certain substrata pseudophores are formed at line of contact between (+) and (−) races.—*A. F. Blakeslee.*

1817. PATTERSON, J. T. *Polyembryony and sex.* Jour. Heredity 10: 344-352. Fig. 4-5. 1919.—The author gives data of the numbers of male, female, and mixed broods of three species of parasitic hymenoptera: *Copidosoma gelechiae*, *Paracopidosomopsis floridanus*, and *Platy-*

gaster sp. The data show a proportion of mixed broods which cannot be explained in all cases by a deposition of two eggs by two different females or by two kinds of eggs by the same female. The hypothesis of non-disjunction of BRIDGES is compared with the two-egg hypothesis in the case of *Platygaster*, which forms all mixed broods having a small proportion of males. The final solution must be found through cytological studies.—*J. H. Beaumont*.

1818. PHIPPS, W. H. **Blending colors in flowers.** *Flower Grower* 7: 76. 1 fig. 1920.—Article contains chart showing results of mixing different pigments or various spectrum hues and urges hybridizers to use such knowledge in choosing parent plants. Author says, "If you want a cream color you pollinate a white with a light yellow. If a scarlet is desired you will pollinate a red flower with a yellow flower."—*J. P. Kelly*.

1819. POLL, HEINRICH. **Mischlingstudien VIII. Pfaumischlinge, nebst einem Beitrag zur Kern-Erbträger-Lehre.** [Hybridization studies VIII. Pea-fowl hybrids and a comment on the theory of nuclear bearers of heredity.] *Arch. Mikrosk. Anat.* 94: 365-458. 5 fig. 1920.—A detailed study of two peacock-guinea-hen hybrids, both males, reared at the Berlin Zoological Gardens. Study includes observations on the living birds and microscopic examination of the testes; also review of other cases and literature on generic crosses in the Phasianidae. The peacock-guinea-hen hybrids were very similar, in general intermediate, but so different from either parent that if found wild they would be adjudged new species. They lack both the crest of the peacock and the head wattles of the guinea. Spermatogenesis in the hybrids ends with synyzesis; the strepsinema stage is entirely lacking.—A large portion of the paper is devoted to a polemic defense of the author's use of the stage of spermatogenesis reached in the hybrids as a measure of the true genetic relationship of the parents. A redefinition of terms is given. Applying the method to the Phasianidae, it is concluded that the guinea is more closely related (genetically) to the fowl than to peacock or pheasant (relationship value = 2); and more closely to the peacock (relationship value = 3) than to the pheasant (relationship value = 4). The distances of the fowl from peacock, peacock from pheasant and pheasant from fowl are all placed at 4 as a minimum.—*Leon J. Cole*.

1820. PRZIBRAM, HANS. **Het ontstaan, de inrichting en de werking van het in het Weenske Vivarium ondergebrachte Instituut voor Biologisch Onderzoek.** [The origin, organization and work of the Institute for Biological Research brought into the Vivarium of Vienna.] *Genetica* 2: 405-450. Sept., 1920.

1821. RABAUD, E. **Recherches sur l'hérédité et la variation. Étude expérimentale et théorie physiologique.** [Studies on heredity and variation. Experimental study and physiological theory.] *Bull. Biol. France et Belgique* Suppl. 1. 313 p. 1919. [See Bot. Abst. 7, Entry 1838.]

1822. RASMUSSEN, H. [German rev. of: DAHLGREN, K. V. OSSIAN. **Erblichkeitsversuche mit einer dekandrischen Capsella bursa-pastoris (L).** (Genetical investigations with a decandrous *Capsella bursa-pastoris* (L).) *Svensk. Bot. Tidsskr.* 13¹: 48-60. 2 fig. 1919. (See Bot. Absts. 3, Entry 616.)] *Zeitschr. Indukt. Abstamm. u. Vererb.* 24: 178-179. Sept., 1920.

1823. RASMUSSEN, H. [German rev. of: KAJANUS, BIRGER. **Ueber eine Kreuzung zwischen zwei Typen von Sommerweizen.** (On the crossing of two types of spring wheat.) *Bot. Notiser* 1918: 245-247. Nov., 1918. (See Bot. Absts 3, Entry 1007.)] *Zeitschr. Indukt. Abstamm. u. Vererb.* 24: 178. Sept., 1920.

1824. RENNER, OTTO. **Oenothera Lamarckiana und ihre Bedeutung für die Mutationstheorie und für die Bastardforschung.** [Oenothera Lamarckiana and its significance for the mutation theory and for hybridization studies.] *Sitzungsber. Ges. Morph. u. Physiol. München* 31: 3-8. 1920.

1825. RENNER, O. [German rev. of: DE VRIES, HUGO. *New dimorphic mutants of the Oenotheras*. Bot. Gaz. 62: 249-280. 5 fig. 1916.] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 170-172. Sept., 1920.

1826. RENNER, O. [German rev. of: DE VRIES, H. *Über monohybride Mutationen*. (On monohybrid mutations.) Biol. Centralbl. 37: 139-148. 1917. IDEM. *Mutations of Oenothera suaveolens* Desf. Genetics 3: 1-26. 4 fig. Jan., 1918. (See Bot. Absts. 1, Entry 19.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 172-175. Sept., 1920.

1827. RIOLLE, Y. TROUARD. *Les hybrides de Raphanus*. [Raphanus hybridus.] Rev. Gén. Bot. 32: 438-447. Fig. 1-3. 1920.

1828. ROSANOFF, AARON J. *A theory of personality based mainly on psychiatric experience*. Psychol. Bull. 17: 281-299. Sept., 1920.—The author maintains that his evidence shows the four defined abnormal types of personality known as the antisocial, cyclothymic, autistic, and epileptic, bear to one another in their blending, relationships analogous to those of coat colors in mice. The most striking feature these varieties of neuropathic constitution have in common is their behavior as Mendelian recessives in relation to normal constitution, the degree of inhibition of manifestation constituting, however, a homogeneous group of Mendelian units. Therefore BATESON's terms epistatic and hypostatic are preferable to dominant and recessive.—Manic-depressive parents often have schizophrenic offspring, rarely the reverse, suggesting an epistatic position for them, but epilepsy apparently occupies a hypostatic position not only in relation to the normal but to all constitutional psychoses.—Mixed conditions are combinations of traits occupying contiguous positions in the scale of dominance. Epileptic phenomena are more often seen in dementia praecox (autistic type) than in manic-depression (cyclothymic type), and autistic phenomena more often in manic-depression than in psychoneurotic (antisocial) cases. So also rudimentary psychoneurotic symptoms are more often seen in normal individuals than are the other kinds of phenomena. The facts of ontogeny seem to show that latent neuropathic elements of personality are, in various combinations and degrees, regular components of so-called normal personality and are particularly susceptible to release through the action of alcohol.—The psychological test data from the author's patients at Kings Park State Hospital show that any degree of intellectual capacity may be transmitted to either of the types of make-up, but the relative frequency of feeble-mindedness seems to increase with descent in the scale of dominance, presumably due to the loss of epistatic factors which are not always made up quantitatively by hypostatic ones.—Nomadism is correlated with the antisocial, autistic, and epileptic constitutions. Handsome physical features are particularly correlated with the cyclothymic type.—Concerning sex-linked traits of personality the author speaks of criminality, drug addiction and autistic psychoses as more frequent in men, while hysteria and cyclothymic tendencies appear more prevalent in women.—*Miriam C. Gould*.

1829. ROUX, WILHELM. *Bemerkungen zur Analyse des Reizgeschehens und der funktionellen Anpassung sowie zum Anteil dieser Anpassung an der Entwicklung des Reiches der Lebewesen*. [Suggestions toward an analysis of stimulation and functional adaptation as well as toward the participation of this adaptation in the development of the realm of living beings.] Arch. Entwicklungsmech. Org. 46: 485-536. 1920.

1830. SAUNDERS, EDITH R. *Multiple allelomorphs and limiting factors in inheritance in the stock (Matthiola incana)*. Jour. Genetics 10: 149-178. 2 pl., 3 fig. Aug., 1920.—Results indicate a case of multiple allelomorphism involving the genes *H* (hoary), *H*₁ (half-hoary), and *h* (glabrous). The data are as follows for the locus or loci under consideration. Among 319 plants in F₂ from hoary × half-hoary none were glabrous (and none of a fourth class possible if hoary and half-hoary were not allelomorphic). Crosses involving hoary-half-hoary heterozygotes by half-hoary-glabrous heterozygotes gave 134 plants, none glabrous. Crosses involving heterozygotes for hoary-half-hoary by homozygous half-hoary gave two classes of plants, 37 of one (hoary) and 45 of the other (mid-hoary). Crosses involving heterozygotes

for half-hoary and glabrous gave 1004 plants, none hoary (and none of a fourth class possible if half-hoary and glabrous were not allelomorphic). Crosses involving half-hoary-glabrous heterozygotes by homozygotic glabrous gave 43 plants, none hoary (and none of a possible fourth class). Data on hoary by glabrous crosses are not given in the present paper. Reviewer has omitted data from experiments in which the results were obscured. Thus, when the proof for the allelomorphism of the genes under consideration depends upon the non-appearance in a cross of a certain class other known genes for such a class must not be involved in the experiment.—*Edgar Altenburg.*

1831. SCHAFFNER, J. H. Dioeciousness in *Thalictrum dasycarpum*. *Ohio Jour. Sci.* 20: 25-34. Dec., 1919.—This form is dioecious, but sex intermediates of any grade can be found in the field. Same diversity among various branches of single individual. Author gives phylogenetic survey of heterosporous plants, bringing out transitions from bisporangiate to dioecious condition. Emphasizes hopelessness of any factorial explanation of sex in plants. Discourages intimate study of sex in any single form which is not backed by appreciation of its phylogenetic relationships.—*Merle C. Coulter.*

1832. SCHALLMAYER, W. [German rev. of: ZIEGLER, H. E. *Die Vererbungslehre in der Biologie und in der Soziologie. Ein Lehrbuch der naturwissenschaftlichen Vererbungslehre und ihrer Anwendungen auf den Gebieten der Medizin, der Genealogie und der Politik, zugleich. 2. Aufl. der Schrift über die Vererbungslehre in der Biologie. Zehnter (Schluss) Teil des Sammelwerkes "Natur und Staat."* (Genetics in biology and sociology. A text book of genetics and its applications in the fields of medicine, genealogy and political science, being the 2nd edition of the work on "Genetics in biology" and tenth (concluding) part of the general work "Nature and the State." *xvi + 479 p., 8 partly colored pl., 114 fig.* Gustav Fischer: Jena, 1918. (See *Bot. Absts.* 2, Entries 923, 963; 3, Entry 1513.) *Arch. Rass.- u. Gesellschaftsbiol.* 13: 204-208. 1920.

1833. SCHINDLER, FRANZ. *Handbuch des Getreidebaus auf wissenschaftlicher und praktischer Grundlage.* [Handbook of grain culture on scientific and practical principles.] 2nd ed., *i + 491 p., 130 fig.* Paul Parey: Berlin, 1920.

1834. SCHMIDT, JOHS. Racial investigations. III. Experiments with *Lebistes reticulatus* (Peters) Regan. *Compt. Rend. Trav. Lab. Carlsberg* 14⁴: 1-18. 1919.

1835. SCHWEISHEIMER, W. Bevölkerungsbiologische Bilanz des Krieges 1914/19. [Populational effects of the war 1914-1919.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 176-193. 1920.

1836. SEILER, J. Geschlechtschromosomen-Untersuchungen an Psychiden. I. Experimentelle Beeinflussung der geschlechtsbestimmenden Reifeteilung bei *Talaeporia tubulosa* Retz. [Sex chromosome investigations on psychids. I. Experimental influencing of the sex-determining maturation division in *Talaeporia tubulosa* Retz.] *Arch. Zellforsch.* 15: 249-268. 1 pl. 1920.—Author believes he has affected distribution of the unpaired sex ("X") chromosome by alterations in temperature and ripeness of eggs, thus influencing sex ratio. In over-ripe eggs X remained in egg (♂ producing) in 146 cases, went to polar body in 101 cases—ratio 101 ♀'s:144♂'s. Eggs produced under same conditions (temperature 12-16°) but not overripe gave 61 ♀'s:45♂'s—ratio 100 ♀'s:74 ♂'s. Warmed eggs (30-37°) gave 52 ♀'s:84 ♂'s—ratio 100 ♀'s:162♂'s. Cooled eggs (3-8½°) gave 49 ♀'s:32♂'s—ratio 100 ♀'s:65♂'s. Totals in each experiment represent from 7 to 14 clutches of eggs, in most of which the deviation is in same direction as that of total. Ratios are based on about one-third of eggs studied; in others distribution of X could not be determined. Author believes that overripe and warmed eggs are "old," and that cold keeps eggs "young;" hence old eggs give excess of males, young eggs excess of females.—*C. W. Metz.*

1837. SEILER, J. [German rev. of: NACHTSHEIM, HANS. *Zytologische und experimentelle Untersuchungen über die Geschlechtsbestimmung bei Dinophilus apatris* Korsch. (Cyto-

logical and experimental studies on the sex determination of *Dinophilus apatris* Korsch.) Arch. Mikrosk. Anat. 93 (Sec. 2): 17-140. 4 pl., 5 fig. Nov., 1919.] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 290-291. Nov., 1920.

1838. SIRKS, M. J. [Dutch rev. of: RABAUD, E. Recherches sur l'hérédité et la variation. Étude expérimentale et théorie physiologique. (Studies on heredity and variation. Experimental study and physiological theory.) Bull. Biol. France et Belgium. Suppl. 1. 313 p. 1919.] Genetica 2: 471-475. Sept., 1920.

1839. SMITH, BERTRAM G. The individuality of the germ-nuclei during the cleavage of the egg of *Cryptobranchus allegheniensis*. Michigan Acad. Sci. Ann. Rept. 21: 105-107. 1919.—A preliminary report of a detailed paper of the same title published in Biological Bulletin 37: 246-287. 1919.—The author finds that during the fertilization of the egg of *Cryptobranchus* (Urodele) the egg and sperm nuclei do not fuse. In the first cleavage mitosis each of these nuclei gives rise to a separate group of chromosomes whose descendants pass separately to daughter-nuclei. This duplexity persists, and "The genetic continuity of each half of the double nucleus has been clearly traced to an advanced cleavage stage."—C. L. Parmenter.

1840. STUART, C. P. COHEN. Die Züchtung der Teepflanze. [Breeding of the tea plant.] Zeitschr. Pflanzenzücht. 7: 157-204. 8 fig. June, 1920.—Brief discussion on species classification of various botanists is given. One species, *Camellia theifera* (Griffith) Dyer, is considered sufficient to cover all types. As in the case of species, confusion exists in the separation of varieties. Comparative study of varieties or sorts and biotypes is made, so that it is possible to recognize and select valuable kinds. Seeds of light weight were found to usually produce inferior plants. Selection of seed, varying from 13 to 19 mm. in diameter, showed no effect according to BERNARD. Variation of a population in time of blooming, disease resistance, branching habit, type and sterility is given in a table. A careful statistical study was made of leaves of numerous races in regard to length, breadth, etc., and the results tabulated. Branching habit was separated into two types and other minor differentiating characters were mentioned. Physiological differences as resistance to diseases were thought to exist. Variation was found in content of caffeine and tannin but differences in yield were difficult to measure. Partial correlation was found between leaf length and breadth and strong individual correlation between length of leaf and tip of leaf. Morphological-physiological relation apparently exists between leaf tip and tannin content, at least only races with a tip over 9 mm. contained more than 15 per cent tannin. Descriptions are given of floral structure and inflorescence. Four forms of sterility occur, namely, bud, bloom, fruit and seed.—Richard Wellington.

1841. TISCHLER, G. [German rev. of: ALLEN, C. E. A chromosome difference correlated with sex difference in *Sphaerocarpos*. Science 46: 466-467. 1917. IDEM. The basis of sex inheritance in *Sphaerocarpos*. Proc. Amer. Phil. Soc. 58: 289-316. 23 fig. 1919. (See Bot. Absts. 4, Entry 486.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 182-183. Sept., 1920.

1842. TISCHLER, G. [German rev. of: KUWADA, Y. Die Chromosomenzahl von *Zea Mays* L. Ein Beitrag zur Hypothese der Individualität der Chromosomen und zur Frage über die Herkunft von *Zea Mays* L. (The chromosome number of *Zea Mays* L. A contribution to the hypothesis of the individuality of chromosomes and to the problem of the origin of *Zea Mays* L.) Jour. Coll. Sci. Imp. Univ. Tokyo 39¹⁰: 1-148. 2 pl., 4 fig. Aug., 1919. (See Bot. Absts. 4, Entry 643.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 294-295. Nov., 1920.

1843. TISCHLER, G. [German rev. of: ROSENBERG, OTTO. Chromosomenzahlen und Chromosomendimensionen in der Gattung *Crepis*. (Chromosome number and chromosome dimensions in the genus *Crepis*.) Ark. Bot. 15¹¹: 1-16. 6 fig. 1918. (See Bot. Absts. 3, Entry 284.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 294. Nov., 1920.

1844. TISCHLER, G. [German rev. of: SAKAMURA, T. *Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen.* (Experimental studies on cell and nuclear division with special reference to form, size, and number of the chromosomes.) Jour. Coll. Sci. Imp. Univ. Tokyo 39¹¹: 1-221. 7 pl., 24 fig. 1920.] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 183-184. Sept., 1920.

1845. TISCHLER, G. [German rev. of: SCHACKE, MARTHA A. A chromosome difference between the sexes of *Sphaerocarpos texanus*. Science 49: 218-219. Feb. 28, 1919. (See Bot. Absts. 3, Entry 1034.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 183. Sept., 1920.

1846. TISCHLER, G. [German rev. of: WINGE, Ø. On the relation between number of chromosomes and number of types, in *Lathyrus* especially. Jour. Genetics 8: 133-138. Pl. 5. April, 1919. (See Bot. Absts. 3, Entry 306.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 182. Sept., 1920.

1847. VON TSCHERMAK, E. Steigerung der Ertragsfähigkeit der Tomaten durch Bastardierung in der ersten Generation. [Increase of productivity of tomatoes through hybridization in the first generation.] Nachr. Deutsch. Landwirtschaftsges. f. Österreich 1918: 425-426. 1918.—Author recalls work of SHULL and of EAST and HAYES on maize wherein poor strains secured by inbreeding gave rise on crossing to good F_1 plants. Points out also similar valuable results in case of F_1 in some domestic animals. Brief report then given of results on four varieties of tomatoes. Most fully investigated were Cooper's First Crop and Ficarazzi, the former of which yielded per plant an average of 3.6 kgm., the latter 3.0 kgm. The F_1 hybrids of these two varieties yielded over 5.1 kgm. per plant (based on 16 plants). Because of ease of securing hybrid seed author deems its production for commerce as worth considering.—James P. Kelly.

1848. URBAN, J. Die Grösse der Rübenknäuel und der Rüben'ertrag. [Size of the beet seedballs and yields of beets.] Zeitschr. Zuckerind. Cechoslovak. 44: 151-155. 1920.—See Bot. Absts. 7, Entry 1714.

1849. VERNET, G. Biométrie et homogénéité. [Biometry and homogeneity.] Bull. Agric. Inst. Sci. Saigon 2: 15-26. 1920.—The author discusses some of the precautions necessary in interpreting distribution curves. He considers it impossible to determine the components of a bimodal or other composite curve. He suggests that the representation of distribution curves be standardized as to number of individuals, scale of ordinates and abscissas to be used in each variety of plant or animal.—Sewall Wright.

1850. WALTHER-GIESSEN. [German rev. of: KUIPER, K., JR. Onderzoekingen over kleur en teekening bij runderen. Naar experimenten van R. Houwink Hzn. (Researches on color and markings in cattle. Based on experiments by R. Houwink Hzn.) Genetica 2: 137-161. 5 pl. Mar., 1920. (See Bot. Absts. 6, Entry 1096.)] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 292-293. Nov., 1920.

1851. WALTHER-GIESSEN. [German rev. of: LITTLE, C. C. A note on the human sex ratio. Proc. Nation. Acad. Sci. [U. S.] 6: 250-253. 1 fig. May, 1920.] Zeitschr. Indukt. Abstamm. u. Vererb. 24: 296. Nov., 1920.

1852. WILDER, HARRIS HAWTHORNE. Physical correspondences in two sets of duplicate twins. Jour. Heredity 10: 410-420. Fig. 15-19. Dec., 1919.—The author points out that there is a comparable degree of similarity of palmar and plantar ridges between duplicate twins as between the rows of scales of the carapace of a single litter of armadillos. Since NEWMAN and PATTERSON have shown that the armadillo is polyembryonic, we may assume that duplicate twins are polyembryonic. After discussing briefly the palm and sole prints of duplicate and fraternal twins, the author presents the measurements and prints of two sets of duplicate twins which show remarkable similarity between the individuals of a twin group and the lateral symmetry of a single individual.—J. H. Beaumont.

1853. WOLTERECK, RICH. Variation und Artbildung. Analytische und experimentelle Untersuchungen an pelagischen Daphniden und anderen Cladoceren. Erster Teil: Morphologische, entwicklungsgeschichtliche und physiologische Variations-Analyse. [Variation and species formation. Analytical and experimental studies on pelagic Daphnias and other Cladocera. Part I. Analysis of morphological, embryological, and physiological variation.] 145 p., 6 pl., 55 fig. Bern, 1919.—See Bot. Absts. 7, Entry 1791.

1854. ZALESKI, LEOPOLD. Wkwestyi metod analityernych w selekcji buraków pastewnych. [Contribution to the analytical method in fodder-beet breeding.] Ziemiańin Posen, 1920.—See Bot. Absts. 7, Entry 1717.

HORTICULTURE

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FLORICULTURE AND ORNAMENTAL HORTICULTURE

1855. ALBERT, C. Questions potagères d'actualité. [Gardening questions appropriate to the season.] Rev. Hort. 92: 143-144. 1920.

1856. ALLWOOD, MONTAGUE C. Carnations—their pests and diseases. Jour. Roy. Hort. Soc. 45: 233-235. Fig. 35-38. 1919.—The two main factors in having healthy carnations are initial clean stock and a correct fertilizer; the latter should be a slow acting organic food. An excess of nitrogen is detrimental. Stem rot is perhaps the most common disease; it can be prevented, but not cured, by proper soil conditions. Bacteriosis or stigmomose may be prevented by propagating from vigorous, healthy plants. Red spider (*Tetranychus telarius*) may be controlled by daily syringing and by the use every fourteen days of specially prepared nicotine extract. Split calyx is caused by irregular soil or climatic conditions, or by the use of unsuitable fertilizers. Various soil pests are controlled by steam sterilization or by allowing chickens access to the soil before it is brought into the greenhouse.—J. K. Shaw.

1857. ANONYMOUS. Articles of agreement between the American Iris Society and the Brooklyn Botanic Garden. Brooklyn Bot. Gard. Rec. 9: 119-121. 1920.—“The essence of this agreement is the development, maintenance, and study of a beautiful, complete, and valuable collection of Japanese irises, and the utilization of it in such a manner as to promote the aims and objects of the Society and the Garden jointly.”—C. S. Gager.

1858. BARRON, LEONARD. The feast of the dahlias. Gard. Mag. 32³: 128-131. 9 fig. 1920.—A discussion regarding exhibits of the American Dahlia Society.—H. C. Thompson.

1859. BARRON, LEONARD. Our own evergreen garden. Gard. Mag. 32³: 133-134. 1 fig. 1920.—Uses of evergreens in decorative planting, with a large list of coniferous and broad-leaved species.—H. C. Thompson.

1860. BIXBY, W. G. Cordiformis-sieboldiana. Amer. Nut. Jour. 11: 56. 1919.—*Juglans cordiformis* is not a species distinct from *Juglans sieboldiana*. E. H. Wilson of the Arnold Arboretum confirms this statement.—E. L. Overholser.

1861. BOYER, JACQUES. Artificial fertilization of flowers. Sci. Amer. 122: 651. 3 fig. 1920.

1862. CHASSET, L. Dans les petits jardins: le gobelet nain. [The dwarf goblet in small gardens.] Rev. Hort. 92: 183-184. Fig. 64. 1920.—Specific directions for the complete development of the goblet form of dwarf tree from the single-stem graft of one year of age are given, since well formed trees are generally not available from the nurseries. This form possesses the following advantages: All the main branches are of equal height; the tree and fruits receive

a maximum of light and air and are more easily cared for; the entire length of all of the branches is net bearing area, with no space unproductive.—*E. J. Kraus.*

1863. COCHET-COCHET. *Deux roses nouvelles.* [Two new roses.] *Rev. Hort.* 92: 142. 1 pl. (colored). 1920.—The variety *Mervouw Dora van Tets* is a brilliant scarlet hybrid tea, seedling of General MacArthur × *Farbenkönigen*, introduced by Leenders and Co. in 1912. The variety *Duchess of Sutherland* is a delicate rose pink hybrid tea, seedling of an unnamed variety, introduced by Alex. Dickson and Son in 1912. Both possess good foliage and vigor.—*E. J. Kraus.*

1864. GIBSON, HENRY. *Forcing shrubs into winter bloom.* *Gard. Mag.* 32¹: 11-13. 4 fig. 1920.—Discusses methods of forcing various flowering shrubs into bloom in the greenhouse.—*H. C. Thompson.*

1865. HARSHBERGER, JOHN W. *The old gardens of Pennsylvania I—Bartram Arboretum and Park.* *Gard. Mag.* 32²: 78-80. 6 fig. 1920.

1866. MCFARLAND, J. HORACE. *A visit to the rose factory.* *Gard. Mag.* 31⁶: 373-374. 2 fig. 1920.—The writer tells of a visit to Dr. Walter VAN FLEET's rose garden at Bell Station, Maryland, and describes some of Van Fleet's productions.—*H. C. Thompson.*

1867. MCFARLAND, J. HORACE. *Walks and talks at Breeze Hill—II. Wherein is reflective, critical, philosophical and friendly comment.* *Gard. Mag.* 32²: 95-97. 5 fig. 1920.—A discussion of several little grown and rare flowers.—*H. C. Thompson.*

1868. MILLER, WILLIAM TYLER. *Shrubs and vines for California gardens.* *Gard. Mag.* 32⁴: 191-193. 1920.—The writer gives a system of choosing the kinds of plants best adapted to soil, climatic and other conditions and lists the plants under the following headings: shrubs that blend with the native landscape; shrubs for protected sunny situations (tender); shrubs for full shade; shrubs for partial shade; shrubs that bloom a long time; shrubs with fragrant leaves or flowers; shrubs attractive in both flower and fruit; shrubs for the interior; deciduous shrubs; shrubs for seaside (wind resisters); bush roses; vines to screen unsightly objects; vines for decorating fine architecture; vines for brick, stone, stucco; vines for decorative effect; vines for shady places; vines for heavy soil (drought resisters). Under each of these headings are listed the names of the plants recommended.—*H. C. Thompson.*

1869. MITCHELL, SIDNEY B. *The whole year round in the California garden.* *Gard. Mag.* 32⁴: 180-186. 4 fig. 1920.—A calendar of operations and lists of plants under the following headings; trees, shrubs, and climbers; spring flowering trees and shrubs; a sequence of bulbs; summer bulbs; rock gardens and walls; perennials, biennials, and annuals for border planting.—*H. C. Thompson.*

1870. PENDLETON, ISABELLA. *Striking perennial combinations.* *Gard. Mag.* 32²: 81-82. 4 fig. 1920.—A short discussion of various combinations using perennial herbaceous plants, also giving a chart suggesting plants to use together with date of bloom for each, color of blossoms, etc.—*H. C. Thompson.*

1871. REA, JOHN L. *Agarden beside the Adirondacks.* *Gard. Mag.* 32²: 88-91. 5 fig. 1920.

1872. RIVOIRE, P. *Sachons orner de fleurs nos maisons.* [Let us know how to decorate our homes with flowers.] *Rev. Hort.* 92: 138-139. 1920.—Discussion of the methods and materials for the making of bouquets, also the selection of bedding plants and decorative shrubs.—*E. J. Kraus.*

1873. SAUNDERS, A. P. *What America has done for the peony.* *Gard. Mag.* 32¹: 29-33. 10 fig. 1920.—A historical sketch of peony development, with a discussion of the part played by pioneer and modern workers in the improvement of this flower.—*H. C. Thompson.*

1874. SESSIONS, KATE O. **Color planting for Pacific coast gardens.** Gard. Mag. 32¹: 205-208. 7 fig. 1920.—Recommends plants, trees, shrubs, and herbaceous plants for various color effects for several types of plantings under different conditions.—*H. C. Thompson.*

1875. SHAMEL, A. D. **A bud variation of the Le Grande Manitou dahlia.** Jour. Heredity 10: 367-368. 10 fig. 1919.

1876. STURTEVANT, ROBERT A. **The decorative element in the foliage of iris.** Gard. Mag. 32²: 103-104. 2 fig. 1920.

1877. STURTEVANT, ROBERT S. **Irises from Japan.** Brooklyn Bot. Gard. Rec. 9: 115-119. 1920.—Treats briefly of the various species, the present confusion in nomenclature, and the agreement recently entered into between the American Iris Society and the Brooklyn Botanic Garden to coöperate in the establishment at the latter place of test and show gardens, with the view of straightening out this confusion. [See also Bot. Absts. 7, Entry 1857.]—*C. S. Gager.*

1878. TAYLOR, NORMAN. **Effects of the winter of 1919-1920 on the woody plants in the garden.** Brooklyn Bot. Gard. Rec. 9: 121-123. 1920.—Gives list of species killed outright, species severely winter-killed but recovering, and species slightly winter-killed.—*C. Stuart Gager.*

1879. THEISS, LEWIS AND MARY. **Ferns for the garden.** Gard. Mag. 32¹: 16-19. 7 fig. 1920.—Discusses various kinds of ferns for different uses.—*H. C. Thompson.*

1880. VAN FLEET, WALTER. **Raising new roses from seed.** Gard. Mag. 31⁶: 370-373. 6 fig. 1920.—Discusses stage of ripeness at which seed should be gathered. Writer favors gathering when fruits are well colored, but still firm. Gives methods of stratifying seeds, methods of planting, soil, etc., and describes methods that have been tried to hasten germination, but favors action of frost and solvent action of snow water. The writer points out the difficulties in growing rose plants from seeds and gives advice regarding the care of the seedling plants of the various kinds of roses.—*H. C. Thompson.*

1881. WESTON, J. G. **Some Irish gardens.** Jour. Roy. Hort. Soc. 45: 247-256. 1919.

1882. WILSON, E. H. **The romance of our trees. XI. Trees of columnar growth.** Gard. Mag. 31⁶: 381-384. 5 fig. 1920.—Describes various species and varieties of trees which have an upright habit of growth, especially upright branched forms of some of the common species of maple, tulip, oak, elm, linden, beech, poplar, and various conifers.—*H. C. Thompson.*

1883. WILSON, E. H. **The romance of our trees. XII. The pigmies and dwarfs.** Gard. Mag. 32¹: 36-40. 9 fig. 1920.—Descriptions of dwarf forms of several species of evergreen trees and of a few deciduous species, together with their uses.—*H. C. Thompson.*

1884. WOODMAN, A. M. **Acacia accessions from Australia.** Gard. Mag. 32¹: 200-202. 7 fig. 1920.—Brief descriptions of several species grown in California and in greenhouses in other parts of the United States; special uses mentioned for some species.—*H. C. Thompson.*

FRUITS AND GENERAL HORTICULTURE

1885. ANONYMOUS. **History of named varieties of pecans.** Amer. Nut Jour. 10: 87. 1919.

1886. ANONYMOUS. **New hybrid fruit plants.** Nation. Nurseryman 28¹²: 290. 1920.—A hybrid between the black currant and gooseberry is reported from Knockando, Speyside, Scotland.—*J. H. Gourley.*

1887. ANONYMOUS. [PALMER, E. F.] Report of the Ontario Horticultural Experiment Station, Vineland Station, Ontario. 1918: 1-40. 1919.—A progress report of experimental and breeding work in horticulture.—*E. F. Palmer.*

1888. ANONYMOUS. Blooming and ripening season of various fruits. Rept. Hort. Exp. Sta. Vineland Sta., Ontario 1918: 24-26. 1919.—A summary of the blooming and ripening dates of commercial varieties of apples, apricots, cherries, peaches, pears, plums and grapes. The dates given cover generally a period of from three to five years' observations.—*E. F. Palmer.*

1889. ANONYMOUS. Raspberry breeding. Rept. Hort. Exp. Sta. Vineland Sta., Ontario 1918: 14. 4 fig. 1919.—Seedlings of the wild forms of *Rubus occidentalis*, *R. strigosus*, and hybrids of these species and of cultivated varieties have been fruited and described. Seedlings of *R. occidentalis* came practically true from seed and as a whole were nearly equal to the cultivated variety Gregg. *R. strigosus* seedlings also came true from seed. Hybrids of *R. occidentalis* (wild black) \times *R. strigosus* (wild red) indicated a compromise in growth and foliage characters. The fruit was all of the purple cane type.—In a reciprocal cross of these species, plants and fruit all closely resembled the *R. strigosus* parent.—From a cross of Gregg (black) \times Cuthbert (red) 152 plants were fruited and bore fruit in the approximate ratio of 1 red to 4 black to 16 purple cane. The reciprocal cross gave all red raspberries.—*E. F. Palmer.*

1890. ANONYMOUS. Self-fertility tests of varieties of pears. Rept. Hort. Exp. Sta. Vineland Sta., Ontario 1918: 29. 1919.

1891. AUBIN, M. L. L'Incision Annulaire du Pêcher. [Ringing of the peach tree.] Jour. Soc. Nation. Hort. France 21: 268-269. 1920.—Gives results of ringing branches of the peach trees to show advantages on earliness, size, and increased yield due to ringing.—*H. C. Thompson.*

1892. BALLOU, F. H., AND I. P. LEWIS. Orchard rejuvenation in southeastern Ohio. (Second Report.) Ohio Agric. Exp. Sta. Bull. 339. 42 p. 1920.—On thin, poor, upland soils a quickly available supply of nitrogen was found to be essential. Phosphorus was beneficial but potash gave poor returns. Annual applications of 5 pounds per tree per year each of nitrate of soda and acid phosphate used in connection with straw mulch gave practically the same results as 10 pounds of each fertilizer not used in connection with a straw mulch. Animal sources of nitrogen and phosphorus (tankage and bone) were found to be much less satisfactory because they act too slowly where quick results are desired. Orchard rejuvenation in southeastern Ohio has been proved to be highly profitable commercially.—*R. C. Thomas.*

1893. BIXBY, W. G. The butternut and the Japan walnut. Amer. Nut. Jour. 10: 76-79. 1919.—There are three groups of walnuts: (1) butternut group; (2) black walnut group; and (3) Persian walnut. It is hardly possible that *Juglans cordiformis* and *J. sieboldiana*, both belonging to group (1), are hybrid between *J. cathayensis*, group (2), and *J. regia* var. *sinensis*, group (3), because nuts show no suggestions of peculiar interior shell structure of group (3) or (2); hence hypothesis advanced to that effect is disproved. The rough shelled Japan walnut may be due to black walnut pollen. There is possibility of developing a nut with the fine flavor of butternut and the smooth thin shell of Japan walnut, and having a long northern and southern range.—*E. L. Overholser.*

1894. BIXBY, W. G. The 1918 nut contest. Amer. Nut. Jour. 11: 72-74. 1919.—Author tabulates new score-card. Six of the characteristics can be quantitatively measured. The cracking quality is the ratio of the weight of the kernel easily extracted to the total weight and is expressed in per cent.—*E. L. Overholser.*

1895. BIXBY, W. G. Nuts without inner shell. Amer. Nut. Jour. 11: 37. 1919.—Author finds nuts without inner shell partition are not entirely unknown even with species which

normally have them. The propagation of these abnormal nuts should be attempted.—*E. L. Overholser.*

1896. BONNET, L. O. The "Yema" graft of the vine. Monthly Bull. Dept. Agric. California 8: 505-508. 1919.—"Yema" budding is a new method of field grafting used in Australia with great success. It is really a process of grafting and not budding, for the eye used as a scion carries a good portion of wood with it. It differs from ordinary grafting by great reduction of size of scion and the time at which it is practised,—the latter part of August and during September. The graft is performed on nearly mature wood. The scion is covered up after graft is made. The percentage of perfect unions obtained is main advantage of "Yema" graft.—*E. L. Overholser.*

1897. BULLARD, W. P. Cultivated pecans are produced now in carload lots. Amer. Nut Jour. 11: 32. 1919.—The plan of collective and brand marketing has been endorsed by growers, consumers and brokers. It is the only scientific method of selling that will eliminate competition between the several varieties and that will harmonize the different sections of the country.—*E. L. Overholser.*

1898. BUNYARD, E. A. Cobnuts and filberts. Jour. Roy. Hort. Soc. 45: 224-232. Fig. 27-34. 1919.—This is a discussion of the history and culture of various types of *Corylus avellana*. The term cob is applied to the short round nuts not covered by a husk and the term filbert to the long nuts quite covered with a husk. These nuts are growing in Kent but there is no reason why they may not be grown in other parts of England as well. Plants are found growing on various soils. Methods of propagation and culture are discussed and a short account of several injurious insects is given. Description of 12 named horticultural varieties is appended.—*J. K. Shaw.*

1899. BURNS, W., AND P. G. DANI. Some facts and figures regarding banana cultivation. Agric. Jour. India 15: 386-392. 1920.—A report showing cost of operation and income from a small banana plot which was run for 3½ years.—*F. M. Schertz.*

1900. CHASSET, L. A propos de la Pêche "Amsden." [The Amsden peach.] Rev. Hort. 92: 144-145. 1920.—Much of the criticism of this American variety is due to the fact that insufficient care was used in selecting the buds and grafts from which to propagate. It is known that there is a possibility of an enormous difference between the individuals arising from the buds variously placed on a tree or on a branch. It is possible to tell whether a variety is good or poor only after grafts have been changed from the region where it is favorably regarded to those in which it is criticized. Amsden is really one of the best varieties of its season and bears well in many parts of France, thousands of trees being grown out of doors.—*E. J. Kraus.*

1901. CORBETT, L. C. Cooperation in and coordination of investigational work in horticulture. Proc. Amer. Soc. Hort. Sci. 16: 145-149. (1919) 1920.—Attention is drawn to the fact that there are so many and varied problems in horticulture needing solution that the investigators in the states and federal department could well afford to cooperate in working them out.—It would help if the different investigators working on the same problem would take uniform data and records, so that the various results could be more easily compared and the effects of certain treatments studied. It would be well if certain projects were duplicated in several parts of the country under different conditions.—In order to study the fundamental problems, it is suggested that well trained horticulturists, plant physiologists, chemists, etc., cooperate in their investigational work.—*E. C. Auchter.*

1902. DANI, P. G. The orientation of the banana inflorescence. Agric. Jour. India 15: 461-462. 1920.—Evidence is submitted which tends to show that the inflorescence appears on the side opposite the cut surface from which it springs.—*F. M. Schertz.*

1903. DARROW, GEO. M. Are our raspberries derived from American or European species? Jour. Heredity 11: 179-184. Fig. 17-20. 1920.—A classification as to species and species crosses of the varieties of raspberries grown in the U. S. A. Classification was made from herbarium material supplemented by field observation and from the history of the variety. Many doubtful cases must be checked up by the plant breeder. A review of material of value to the fruit breeder.—J. H. Beaumont.

1904. DEMING, W. C. Why not develop walnuts, hickory nuts, filberts, butternuts, and chestnuts? Amer. Nut Jour. 11: 23. 1919.

1905. DRIEBERG, C. A freak pawpaw (*Carica Papaya*). Jour. Heredity 10: 207. 1919.—Trees found in Ceylon bearing sulphur yellow fruits, the smaller fruits being almost white. Seeds in part bred true, in part gave rise to trees bearing the ordinary green fruits.—J. R. Schramm.

1906. EDWARDS, C. L. Lessons of the season. Amer. Nut Jour. 11: 94. 1919.—Emphasizes proper drainage for pecan trees.—E. L. Overholser.

1907. EDWARDS, C. L. Official report on nut growing in Texas. Amer. Nut Jour. 11: 95, 97. 1919.

1908. FLETCHER, S. W. Observation on French horticulture. Proc. Amer. Soc. Hort. Sci. 16: 136-140. (1919) 1920.—Information is given concerning the amount and character of horticulture in France. As compared to America's extensive plantings and commercial orchards, fruit and vegetable growing is more intensive in France. Likewise there is a much keener interest in amateur horticulture. More dwarf trees are used and they are very carefully trained into various shapes and patterns.—E. C. Auchter.

1909. GALLARD, L. Strawberry culture around Sydney. Agric. Gaz. New South Wales 31: 731-737, 815-820. 10 fig. 1920.—Popular description of methods is given, including method and time of planting, varieties, mulching, treatment of runners, harvesting and irrigation, along with other details.—L. R. Waldron.

1910. GALLOWAY, BEVERLY T. Some promising new pear stocks. Jour. Heredity 11: 25-32. Fig. 10-17. 1920.—About five million pear trees must be grown each year to meet the losses caused by fire-blight and normal orchard increase. The Office of Foreign Seed and Plant Introduction, U. S. A., has introduced a large number of pears and during the last few years has given considerable attention to testing them for stock breeding purposes and for fruit. The office highly recommends the Chinese Calleryana pear as the most rapid growing, most easily budded, and most resistant of any stock. Several others of these Chinese importations are much superior to the French stock that is now used.—J. H. Beaumont.

1911. GUILLAUMIN, A. Citranges, limonanges, satsumanges. Rev. Hort. 92: 140-142. Fig. 50-51. 1920.—Hybrids between *Citrus trifoliata* and the various subspecies of *Citrus Aurantium*, known as citranges, have been secured by Trabut in Algiers, Bernard at Montauban, and Webber and Swingle in Florida. Among these the two varieties Armand Bernard and Rusk are best known. A second lot of seedlings was obtained by Bernard by crossing several varieties of oranges with *C. trifoliata*. These are distinct from the other type of citrange and are designated as Citrange de Montauban amélioré. The fruits of at least two forms are edible. (To be continued.)—E. J. Kraus.

1912. HATTON, RONALD G. A first report on quince stocks for pears. Jour. Roy. Hort. Soc. 45: 269-277. Fig. 62-66. 1919.—Beginning in 1914 a collection of quince stocks used for pear propagation has been acquired from various English and foreign nurserymen at the Wye College Fruit Experiment Station. Out of this collection five chief groups or types have been distinguished and their botanical and horticultural character described and illustrated. Their probable identifications are A. d'Angers, B. Common, C. Unknown, D. de Fontenay and

E. Portugal. Further study may reveal additional types. Propagation has been by both layers and cuttings and the various types root with varying degrees of success. The value of these several types for different varieties of pears will now be tested.—*J. K. Shaw.*

1913. HATTON, RONALD G. Suggestions for the right selection of apple stocks. *Jour. Roy. Hort. Soc.* 45: 257-268. *Fig. 46-61.* 1919.—In the popular mind there are three types of stocks: (1) paradise or dwarfing stocks for bush trees only; (2) free growing stocks for standard trees; and (3) crab stock from tips or suckers of the "true wild crab" for the same purpose as (2). Investigation shows that there are eight or nine types of paradise in general use, varying in vigor from those from free stocks to those forcing vigorous varieties into bearing the second year. No correlation was found between the vigor of growth and the type of root system; the same proved to be true of free and crab stocks. Many of the free stocks showed root knots and exhibited the possibility of easy vegetative propagation. Although strong growing varieties may largely obliterate the inequalities in stocks, differences again become apparent in the second and third year. It was found possible to raise stocks of deep anchorage by layers and other vegetative methods.—*J. K. Shaw.*

1914. HOOKER, HENRY D. Methods of approach to horticultural problems. *Proc. Amer. Soc. Hort. Sci.* 16: 140-145. (1919) 1920.—Attention is drawn to the fact that there is wide diversity of opinion among leading horticulturists of the country on many of the fundamental questions of orchard management. Several examples, notably bud selection, orchard pruning, and orchard fertilization, are cited. The author states, "with these experiments, the knowledge of the fundamental changes within the plant is wanting and it is only by means of this knowledge that we can judge the value of the effects procured. It is only by paying attention to the changes going on inside of the organism and by obtaining exact information of what these changes are, that uniformity of conclusions must result." It is suggested that in attacking problems of nutrition and physiological regulation of fruit trees, a diagnosis should first be made and then the effects of various treatments determined. Finally, application to specific cases is possible with the above knowledge.—The value of the work of KRAUS and KRAYBILL in this direction is pointed out. It is suggested that in the case of fruits, analysis of fruit spurs and buds could be made in order to secure an exact indication of the prevailing physiological conditions. The effects of various treatments on the chemical composition of the plant should then be determined. With this information, the author says, "Eventually it should be possible to analyze a few fruit spurs from a tree and to know immediately wherein the physiological condition of that tree is abnormal with respect to maximum productivity and to know what treatments will correct the abnormality."—*E. C. Auchter.*

1915. HOWARD, W. L. Progress report on rootstock experiment. *Monthly Bull. California State Commission Hort.* 8: 13-14. 1919.—The following results were obtained with varieties and stocks from one to four years of age: Bartlett on quince stocks are failing rapidly, whereas those on Japanese and French stocks show healthy growth; Royal Ann thrives equally well on Mazzard and Mahaleb, as does the almond on Myrobalan, peach, and almond stocks; a Royal apricot and Burbank plum thrive best on peach stock. Asphaltum used on trees as a protection against rabbits or borers has no injurious effect on the bark.—*E. L. Overholser.*

1916. HOWARD, W. L. What root stocks are we using? *Nation. Nurseryman* 28^{1/2}: 288-290. 1920.—A survey showing the percentage of root stocks in use for the various deciduous fruits of California three years ago, and the changes which occurred during that period. Recommendations are made in regard to the best usage.—*J. H. Gourley.*

1917. JACKSON, V. G. Cultivation of the vine in America. [Rev. of: HEDRICK, U. P. *Manual of American grape-growing.* xiii + 454 p., 32 pl. Macmillan Co.: New York and London, 1919.] *Nature* 105: 674. 1920.

1918. JONES, J. F. The heart-nut. *Amer. Nut Jour.* 10: 36. 1919.—Heart-nut, *Juglans cordiformis*, is a "sport" or variation from *J. Sieboldiana*, the common Japan walnut. It is a very regular and prolific bearer, the nuts being heart-shaped, smooth, brown in color, and of excellent quality. The author advises its propagation.—*E. L. Overholser.*

1919. KEGLEY, H. C. A promising new Persian walnut. Amer. Nut Jour. 10: 54. 1919.—The Ehrhardt is a variety which may be expected to bear 25 to 50 per cent heavier than any other known variety. It is resistant to blight and has a tendency to bear early. It will prove most satisfactory and profitable in Southern California.—*B. L. Overholser.*

1920. KRUCKEBERG, HENRY W. A half million dollar nursery industry. Amer. Nurseryman 32^o: 119-120. 1920.—Statistics are given on the nursery and fruit business of California and estimates are made of the increase over the last census. It is stated that the nurserymen of California have made a serious and consistent effort to produce high grade stock, free from pests, and to select varieties adapted to the special sections.—An account is also given of the development of the California Nurserymen's Bud Selection Association.—*J. H. Gourley.*

1921. LINTON, W. S. A great step in advance for nut culture. Amer. Nut Jour. 10: 67. 1919.—Through the agency of Senator H. A. Penny the Michigan legislature passed a bill providing for extensive planting of nut bearing or other food producing trees along the highways of the State of Michigan, and the maintenance, protection and care of such trees.—*E. L. Overholser.*

1922. LINTON, W. S. Nut trees for highways and public places. Amer. Nut Jour. 11: 87. 1919.—The author recommends maple tree, black walnut (*Juglans nigra*) and butternut (*Juglans cinerea*), and also the white oak (*Quercus alba*) and the bur oak (*Quercus macrocarpa*).—*E. L. Overholser.*

1923. McCRAE, LEE. Foreign fruits at home on our west coast. Gard. Mag. 32: 203-204. 2 fig. 1920.—At least thirty kinds of introduced fruits, besides olives, apricots, and the citrus varieties, are grown in Orange County, California. The conditions under which the various fruits thrive are given, especially the requirements for mango, sapote, cherimoya, date, papaya, avocado, and nutmeg. Other fruits mentioned are: St. John's bread or carob, feijoas, pomegranates, persimmons, jujubes, varnish nuts, camphor, loquats, kumquat, chaotes, citron, and guava.—*H. C. Thompson.*

1924. MAWBRA, WALLACE. Vanilla beans. Practical Druggist 38¹¹: 61-62. 1920. [Taken from Nation. Bottlers Gaz.]—An account of the discovery, history, habitat, growth, curing, and assorting of vanilla "beans," *Vanilla planifolia*.—*Wm. B. Day.*

1925. NOMBLOT, A., ET 'F. L.' La protection des nouveautés horticoles. [The protection of horticultural novelties.] Rev. Hort. 92: 148-149. 1920.—Somewhat detailed suggestions regarding means and methods for securing just consideration and recognition of new varieties as well as protecting them against false exploitation.—*E. J. Kraus.*

1926. PATTERSON, J. M. Report of committee on markets and marketing. Amer. Nut Jour. 11: 75-78. 1919.

1927. PEARCY, K. Fourth general meeting of the Western Walnut Growers' Assn. Amer. Nut Jour. 10: 32-33, 42. 1919.—Newly planted walnut tree should be cut off at about 30 inches and the next spring the shoot should be cut off at the height desired for the head—4½-6 feet.—The filbert mite was introduced from Italy on filbert stocks. Injury consists in galling the leaf and fruit buds and the catkins. It is satisfactorily controlled by application of lime-sulfur spray (1:12) as early as the female blossoms are dried up. Possibly the aphid transports walnut blight bacteria (Prof. LOVETT).—*E. L. Overholser.*

1928. PERRY, A. S. Pruning pecans in the Albany district. Amer. Nut Jour. 13: 22. 1920.—By far the majority of growers prefer the medium height system, which brings all the advantages of the low and high headed systems and has none of their disadvantages. Amount of shade on ground and cultivation facilities are the main considerations.—*E. L. Overholser.*

1929. PICKERING, SPENCER U. [Annual report.] Rept. Woburn Exp. Fruit Farm 17: 1-87. 3 fig. 1920.—[Some copies of this report contain an appendix on Flocculation reprinted from Proc. Roy. Soc. London A, 94: 315-325. 1918.]—(1) *Action of grass on trees*. In pot experiments the injurious effect of grass grown above the roots is the same whether the grass is grown in sand or in loam and is independent of the thoroughness with which the grass roots intermingle with or are separated from the roots of the trees. This is what would be expected if the injurious effect is due to a soluble toxin produced during the growth of the grass rather than an effect of competition for water and nutrients. Striking effects were obtained by grassing over portions of orchards which had been under tillage; the crop was reduced by 5 per cent the first season and by 50-90 per cent the second; recovery did not follow even a year after the grass was removed. (2) *Experiments with soft-wooded plants*. The experimental plants were grown in pots and subjected to the action of surface growth consisting of grass and numerous other plants grown in an annular, perforated tray resting on the soil in the pot. A deleterious effect of one crop on another is a general action applying to all plants alike, though there may be differences in the extent to which different plants are effected or capable of injuring others. The nature of the toxin is unknown but it is easily oxidizable and may then serve as plant food; as a result of this, soft-wooded plants may make some recovery from the toxic action of other plants grown above their roots, but hard-wooded plants are rapidly, and apparently permanently, stunted. The toxic effect is not due to carbon dioxide produced in the soil by the surface growth and can not be counteracted by lime or by cresylic acid. The deleterious effect is reciprocal and trees were found to retard the growth of grass and crops planted beneath them in a manner independent of water and nutrient competition and shading effects. (3) *Behavior of plants in masses*. Plants were grown in rectangular pots, some undivided and others divided into six compartments to prevent root interference. Where the mass of soil is below a certain limit, the amount of plant growth is independent of the number of plants, i.e., the growth of individual plants is proportional to the area occupied by each *provided the plants are of the same age*. When plants of different ages are mingled, the older plants flourish at the expense of the younger ones and the total growth may be 20 per cent below the maximum possible when all the plants are of one age. A difference of 4 days in the age of mustard plants reduced the total crop by this amount. This effect is attributed to the toxic action of the older plants, the quantity of toxin produced being proportional to the amount and vigor of the growth. Interference of the above ground parts has very little effect on the amount of growth unless actual crowding occurs, since even great increase of the distance between plants does not result in an increase in growth greater than 15 per cent. The fact that border plants in field plots exceed the interior plants, is attributed to root interference within the plot, and more rapid oxidation of the toxins at the border. The inferiority of the interior plants can not be due to competition for food since the same effect is observed when the plots receive applications of fertilizers in excess of those which give beneficial returns. (4) *Drainage and toxicity*. An important effect of drainage is attributed to the removal of toxins produced in the soil by the surface growth.—*Freeman Weiss*.

1930. QUINN, GEO. Notes on olive growing. Jour. Dept. Agric. South Australia 23: 603-606. 1920.

1931. REED, C. A. Pecan grades and standards. Amer. Nut Jour. 11: 69. 1919.—The importance of a definite table of grades is realized. The number of nuts per pound is not a safe criterion in establishing a grade. The author divides pecans into three groups each with two standards based on diameter measurements.—*E. L. Overholser*.

1932. RINGELMANN, M. Sur la resistance du vitrage des serres. [The resistance of greenhouse glass.] Rev. Hort. 92: 146. 1920.—The resistance of ordinary double glass, and of cast striated glass of the same thickness is the same, as shown by an accompanying table.—*E. J. Kraus*.

1933. SARGENT, C. S. Forty-two distinct forms of hickories. Amer. Nut Jour. 10: 20-21. 1919.

1934. SEYMOUR, L. D. Must we revise our pruning practices? Gard. Mag. 32¹: 27-28. 4 fig. 1920.—A popular discussion of some results of pruning fruit trees based on work by W. H. CHANDLER of Cornell University.—*H. C. Thompson.*

1935. SHAMEL, A. D. Origin of a grapefruit variety having pink colored fruits. Jour. Heredity 11: 157-159. Fig. 5-8. 1920.—An account of the origin of two bud sports of grapefruit having pink colored flesh, one introduced by Reasoner Brothers of Oneco, Florida, as a sport of Walters, the other as a sport of Marsh in California.—*J. H. Beaumont.*

1936. SHAMEL, A. D. Origin of a new and improved French prune variety. Jour. Heredity 10: 339-343. Frontispiece, fig. 1-3. 1919.—A bud sport of the French prune (*Prunus domestica*) propagated in California and bearing fruits about twice the size of those of the parent variety.—*J. R. Schramm.*

1937. TAYLOR, R. H., AND E. L. OVERHOLSER. Some effects of high temperature and humidity upon the keeping quality of Bartlett pears. Monthly Bull. California State Commission Hort. 8: 118-125. 1919.—When contrasted with temperatures between 70° and 85° F., temperatures of 87.7 to 110° F. caused an appreciable delay in the ripening. The retardation of ripening is directly proportional to temperature between the limits of 87 and 104° F. Above 110° F. rapid physiological breakdown results. Relative humidity does not seem to be a significant factor in checking the ripening process. The flavor of pears subjected to temperatures higher than 85° F. was not normal, being sweetish and slightly acid, juiciness was lacking. The effects of high temperatures are believed to be due to the different rates of enzymatic action at the different temperatures, a reduction of enzymatic action at the extremely high and low temperatures retarding the ripening of the pears.—*E. L. Overholser.*

1938. TUFTS, W. P. Influence of heavy and light pruning upon the growth of deciduous fruit trees. Monthly Bull. Dept. Agric. California 8: 529-535. 1919.—Heavy cutting back does not, as was originally supposed, result in renewed and vigorous root development. After heavy pruning the energies of the tree are directed toward replacing the lost foliage area, resulting in lessened fruit production. The author's experimental results agree with those of PICKERING (Woburn), and ALDERMAN and AUCHTER (West Virginia), in that by light pruning large and strong trees are most quickly secured, and that it is at the same time conducive to precocious and prolific fruit production.—*E. L. Overholser.*

1939. TUFTS, W. P. Why prune bearing apricot trees heavily? Monthly Bull. California State Commission Hort. 8: 15-21. 1919.—The so-called "Winters system" of apricot pruning has two very serious objections: (1) The upper side of the scaffold branches is very subject to sunburn; and (2) the heavy annual pruning is repressive in its effect. On the other hand, in the "long-pruning" system, abundant vegetative growth is produced to shield the branches, and the crop is borne both on spurs and on young shoots. To reduce wood growth and increase fruitfulness in vigorously growing trees the author knows of no better method than a dormant thinning-out process not accompanied by heading.—*E. L. Overholser.*

1940. WHIRTON, T. W. A trip through the almond section of Spain. Amer. Nut Jour. 10: 50-51. 1919.—Spain, including her Mediterranean Islands, produces 25 per cent of the world's annual output of almonds,—approximately 80,000 tons. Her mainland almonds are cultivated more or less in all the territory bordering on the Mediterranean from Catalonia to Andalusia and extending some distance into the interior. They are extensively cultivated also on the Balearic Islands, where soil and climate are specially propitious for normal growth and profitable development.—*E. L. Overholser.*

1941. WHITE, ANNA. Creating a new fruit. Gard. Mag. 32²: 156-158. 3 fig. 1920.—A discussion of the development of the blueberry together with brief directions for its culture.—*H. C. Thompson.*

1942. WHITTEN, J. C. Efficiency management of California orchards. Monthly Bull. California State Commission Hort. 8: 5-6. 1919.

1943. WHITTLE, A. H. The possibilities of citrus culture in India. *Agric. Jour. India* 15: 444-450. 1920.—The author believes that citrus fruits may be advantageously raised.—*F. M. Schertz.*

1944. WILKINSON, J. F. Top grafting northern pecan trees. *Amer. Nut Jour.* 10: 48-49. 1919.—Seedling pecan trees, though most of them produce nuts of very little value, are the foundation of very valuable nut trees in the future if topworked to the better varieties. The author advises using slip-bark grafting. All cut surfaces should be covered with a good coat of grafting wax which in turn is covered with cloth.—*E. L. Overholser.*

1945. YOUNG, W. J. Muscadine grapes: culture and varieties. *South Carolina Agric. Exp. Sta. Bull.* 205. 48 p. *Fig. 1-19.* 1920.—The climatic and soil requirements of muscadine grapes, planting and cultivating, pruning and training systems, harvesting and handling methods, production and propagation of improved varieties, diseases and insects, varieties and their characteristics, are discussed.—*D. B. Rosenkrans.*

VEGETABLE CULTURE

1946. ANONYMOUS. Dwarf French beans at Wisley, 1919. *Jour. Roy. Hort. Soc.* 45: 316-333. 1919.—Report is made of the trial of 253 stocks of beans. The awards of the fruit and vegetable committee are given, also a classification of varieties with brief descriptions.—*J. K. Shaw.*

1947. ANONYMOUS. Irrigation and fertilizer experiments with beets. *Rept. Hort. Exp. Sta. Vineland Sta. Ontario.* 1918: 31-33. 1919.—Nitrate of soda when used with irrigation gave the greatest gains. Nitrate of soda alone gave almost as great gains as when combined with irrigation. Irrigation alone gave a very low average gain over non-irrigation, but varying greatly from year to year with different weather conditions.—*E. F. Palmer.*

1948. ANONYMOUS. Lettuce at Wisley, 1919. *Jour. Roy. Hort. Soc.* 45: 334-353.—Report is made of the trial of about 280 stocks of lettuce including cutting, cabbage, and cos lettuces. The awards of the fruit and vegetable committee and a classification with brief descriptions are given.—*J. K. Shaw.*

1949. ANONYMOUS. Winter lettuce at Wisley, 1917-18. *Jour. Roy. Hort. Soc.* 45: 354-359. 1919.—Report is made of the trial of 115 stocks of winter lettuce. The awards of the Judging Committee and a classification with brief descriptions are given.—*J. K. Shaw.*

1950. BENNETT, E. R. The effect of good seed on the vegetable industry. *Monthly Bull. California State Commission Hort.* 8: 298-302. 1919.—Good seed from the growers' standpoint is seed of a given variety, of good viability from high yielding healthy plants, true to the type of given variety, and free from the influences of pollination from other varieties or undesirable strains of the same variety. The grower should therefore get his seed from the professional seedsman to produce a highly standardized and improved crop of vegetables.—*E. L. Overholser.*

1951. KEIL, J. B. Growing garden beans of high quality. *Monthly Bull. Ohio Agric. Exp. Sta.* 5: 287-293. 1920.—The article comprises a description of certain varieties suitable for culture. Special reference is made to the cooking test of the beans in the snap-pod stage. Those found to be most satisfactory when cooked were as follows, named in the order of their excellence: Round-Pod Kidney Wax (Brittle Wax); Burpee's Stringless Green Pod; Wardwell's Kidney Wax; Bountiful; Challenge Black Wax and German Black Wax (Sure crop). A brief description is given of each variety and points of excellence are mentioned.—*R. C. Thomas.*

1952. MOTTET, S. Une nouvelle rhubarbe. [A new rhubarb.] *Rev. Hort.* 92: 147-148. *Fig. 53.* 1920.—*Rheum Alexandrae*, introduced in 1909, may prove to be a valuable ornamental

because of its tall stems which bear large, overlapping, creamy white bracts. The flowers are small and inconspicuous. The plants are entirely hardy and are propagated mainly by division of established crowns.—*E. J. Kraus*.

1953. ROGERS, S. S. Vegetable seed improvement. Monthly Bull. California State Commission Hort. 8: 302-303. 1919.

HORTICULTURAL PRODUCTS

1954. CRUESS, W. V. The evaporation of vegetables. Monthly Bull. California State Commission Hort. 8: 93-100. 1919.—During the war the great demand for dried vegetables greatly stimulated production. The vegetables are peeled, blanched 3-8 minutes to destroy the oxidase which otherwise brings about discoloration and disagreeable flavor, and dried. The temperature of the evaporator is gradually raised from 120-150° F. Discoloration and decomposition of the products result when temperature goes beyond 150° F. Dried potatoes should contain less than 10 per cent of moisture, other vegetables less than 8 per cent. Immediately after being dried the products are packed in insect-free and moisture-free containers. In the presence of moisture, fungous growth results.—*E. L. Overholser*.

1955. WOOD, M. N. Shall we dry peaches ripe or moderately green? Monthly Bull. California State Commission Hort. 8: 116-117. 1919.—The dried products from ripe peaches give a larger yield, have better quality, and are more attractive.—*E. L. Overholser*.

1956. YOUNG, W. J. Products and utilization of Muscadine grapes. South Carolina Agric. Exp. Sta. Bull. 206. 37 p. Fig. 1-4. 1920.—The possibilities of muscadine grapes for home and commercial products, and the equipment needed for producing them, are discussed. The characteristics of different varieties making them suitable for various uses are given, as well as directions for the making of such products as grape juices, jellies, canned grapes, flavoring syrups, grape paste, marmalade, preserves, jams, spiced grapes, conserves, mince meat, and catsup.—*D. B. Rosenkrans*.

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

1957. BAILEY, I. W. The cambium and its derivative tissues. II. Size variations of cambial initials in gymnosperms and angiosperms. Amer. Jour. Bot. 7: 355-367. 3 fig. 1920.—The author calls attention to the striking differences in size of secondary xylem cells which characterize various groups of woody plants, and to the fact that in the evolutionary series from gymnosperm tracheid to angiosperm vessel there has been a radical decrease in length. Certain of these size variations are thus evidently germinal, whereas others are somatic or environmental. The size of a given secondary xylem cell is evidently determined by (1) the size of the cambium initial from which it develops and (2) the changes which take place during its differentiation. The author has made a reconnaissance survey covering 32 families, in which he has measured the length of the cambium initials, the vessel segments, and the tracheids or fiber tracheids. Great differences in the length and volume of the cells were observed. In *Ginkgo* and the Coniferae the length of the cambial initials closely resembles that of the last formed tracheids. In most dicotyledons the initials are considerably shorter than the fiber tracheids but are of about the same length as the vessel segments.—The author calls attention to the fact that the cambium "appears to be an unusually favorable medium for the study of problems relating to cell size and body size, the working sphere of the nucleus, the nucleo-cytoplasmic relation, and phenomena of cytokinesis in somatic tissues."—*E. W. Sinnott*.

1958. BRIERLEY, C. H. Plant hairs. Ann. Rept. and Trans. Manchester Microsc. Soc. 1916: 55-61. 1918.—A discussion of the nature and location of hairs, of theories regarding the relation of various stimuli to hair production, and of the functions of hairs and other epidermal outgrowths.—*C. E. Allen*.

1959. CAMPBELL, D. H. The genus *Botrychium* and its relationships. Proc. Nation. Acad. Sci. [U. S.] 6: 502-503. 1920.—The embryo of *B. obliquum* Mühl is described. Relationship to *Ophioglossum* and to *Helminthostachys* and the Marattiaceae is indicated. This species and the two others, *B. lunaria* (L.) Sw. and *B. virginianum* (L.) Sw., whose life histories are known, probably differ enough in embryo and sporophyte to be placed in three separate genera.—*Howard B. Frost*.

1960. DANIEL, LUCIEN. Réactions antagonistiques et rôle du bourrelet chez les plantes greffées. [Antagonistic reactions and the rôle of the fusion layer in vegetable grafts.] Compt. Rend. Acad. Sci. Paris 170: 1512-1515. 1920.—The fusion layer, especially in herbaceous plants, contains parenchyma which predominates for a long time. The lignified vessels are few and distorted. The fusion layer modifies conduction and hence the quantitative and qualitative distribution of water and solutes. The scion may send off roots either internally or externally. These may penetrate the cortex or pith but rarely the cambium layer. The regenerated branches of the stock often penetrate the cambium layer and thence the cortex, but they have never been found penetrating the pith or dead tissues of the scion. This throws some light on the nature of graft hybrids.—*C. H. Farr*.

1961. GATIN, V. C. Recherches anatomiques sur le pédoncule et la fleur des Liliacées. [An anatomical study of the peduncle and flower of the Liliaceae.] Rev. Gen. Bot. 32: 369-437. Fig. 1-31. 1920.—An attempt was made to determine whether the histological character of these structures might not be valuable in classification. The plants were studied when in full bloom, but before pollination had taken place. The author finds that the number, structure, and distribution of the vascular bundles in the peduncle, coupled with their distribution to the floral parts, can be used to show the relationship of the tribes, genera, and species in this family. In the first chapter nine tribes of the sub-family Lilioideae are covered.—*J. C. Gilman*.

1962. NOBÉCOURT. Sur la structure anatomique des tubercles des Ophrydées. [On the anatomical structure of the tubercles of orchids.] Compt. Rend. Acad. Sci. Paris 170: 1593-1595. Fig. 1. 1920.—The "pedicule" upon which the tubercle is borne has arisen by the concrescence of a branch with a leaf and with the cortical tissue of the adventitious root, the lower portion of which gives rise to the tubercle itself. The vascular system of the branch is a schizostele which varies from a monostele to a polystele. The upper part of the tubercle is partly cauline and partly radical. The middle and lower portion is entirely that of the polystelic adventitious root.—*C. H. Farr*.

1963. SCHWEDE, R. Nochmals über die Lupinenfaser. [More about lupine fibers.] Jahresber. Ver. Angew. Bot. 16: 14-18. 1918.—A discussion of the relative value of various species of *Lupinus* as a source of commercial fiber. Author describes results of microchemical tests for cellulose, lignin, etc., and compares his results with those of HANAUSEK. Of the three species which he finds available in sufficient quantity to be of use in the present crisis, he considers the fibers of *Lupinus albus* less suitable than those of *L. lutens* and *L. angustifolius*.—*P. J. Anderson*.

1964. SCHWEDE, R. Zur Kenntniss der Hopfenfaser. [Investigation of hop fibers.] Jahresber. Ver. Angew. Bot. 16: 8-13. 1918.—A microscopical and chemical investigation of the bast fibers and adjacent tissues of the hop plant (*Humulus Lupulus* L.). Author finds that the morphological characters are much the same as for other members of the Urticaceae. He believes that the qualities of the fiber are such that they could be used in the manufacture of textiles, at least under stress of such conditions as existed during the world war. The fiber was successfully used in the manufacture of paper.—*P. J. Anderson*.

1965. TROTTER, A. Della supposta partenocarpia del nocciuolo e dei suoi eventuali caratteri: osservazioni ed esperienze. [On the supposed parthenocarp of the hazel-nut and its eventual characters.] Atti R. Accad. Lincei, Roma, Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29¹: 72-76. 9 fig. 1920.—Author concludes that vegetative parthenocarp does not exist in the hazel-nut since the female aments do not develop further if the stigmas are not properly pollinated. He found that at the time the stigmas are pollinated the ovary is not yet formed and that it is formed only in flowers whose stigmas are pollinated. Normally there are two ovules of which one, after the period of fecundation, is destined to abort. Even in the majority of nuts that fall prematurely there exist imperfect seeds with atrophied embryos. He therefore concludes that this is not a case of parthenocarp but that it may represent a form of degeneration of the reproductive phenomena and may be a true type of abortion similar to that in animals.—F. M. Blodgett.

1966. VIGUIER, R., ET H. HUMBERT. Le *Cassytha filiformis*. Bull. Soc. Philomathique Paris X, 10: 53-54. 1918.—A plant of this species is described, growing on a sandy beach near Tamatave, which had grown over a surface of several square meters without finding a possible host plant, and which was forced therefore to lead an independent existence. It had produced abundant flowers and fruits, and its unusual mode of life seemed not to have entailed any morphological modification. Some of the branches, coming in contact with an older branch of the same plant, had coiled about the latter and pushed suckers into it.—C. E. Allen.

1967. WEISS, F. E. Seeds and seedlings of orchids. Ann. Rept. and Trans. Manchester Microsc. Soc. 1916: 32-43. Fig. 1-6. 1918.—The small size of the seeds of orchids and the rudimentary condition of the embryo in mature seeds are discussed in relation to the epiphytic habit of many members of the family. The author describes the mycorrhiza of orchids and the bearing of this condition upon their nutrition; the infection of the embryo, previous to the germination of the seed, by the species of *Rhizoctonia* concerned in mycorrhizal development; the effect upon the fungus of cultivating it in artificial media; and the replacement of the stimulating effect of the fungus in the germination of orchid seeds by the use of salep decoctions. He compares the conditions in *Calluna vulgaris*, in which case the fungus is already present in the mature seed, with that in orchids, whose seeds must be infected from without.—C. E. Allen.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1968. ANONYMOUS. [Note without title.] Nature 104: 572. 1920.—The possible disposition of the important moss herbarium belonging to JULES CARDOT is discussed. This herbarium contains between 30,000 and 40,000 specimens, including the types of many new species described by Cardot.—O. A. Stevens.

1969. CULMANN, P. Contributions à la flore bryologique de la Suisse et de l'Auvergne. [Contributions to the moss flora of Switzerland and the Auvergne.] Rev. Bryologique 47: 21-24. 1920.—Distributional and critical notes are given on 7 hepatics and 8 mosses from Switzerland and the Auvergne region of central France. Two of the species represent additions to the flora of Switzerland and 2 to the flora of the Auvergne, while several old records are corrected. Under the name *Lophozia opacifolia* a new subspecies or variety of *L. incisa*, collected by the author in Switzerland, is described.—A. W. Evans.

1970. DISMIER, G. Le *Frullania riparia* Hampe et le *Marchantia paleacea* Bertoloni a Amélie-les-Bains (Pyr.-Or.). Rev. Bryologique 47: 24-26. 1920.—The discovery of *Frullania riparia* and *Marchantia paleacea* at Amélie-les-Bains in the department of Pyrénées-

Orientales, France, is announced. Full notes regarding distribution are given under each species, and some doubt is thrown on the validity of the *Frullania*, owing to the constant absence of perianths.—A. W. Evans.

1971. DIXON, H. N. Description of the mosses. In: TRECHMANN, C. T. On a deposit of interglacial loess, and some transported preglacial freshwater clays on the Durham coast. Quart. Jour. Geol. Soc. London 75: 200. 1920.—See Bot. Absts. 6, Entry 797.

1972. DIXON, H. N. Reports upon two collections of mosses from British East Africa. Smithsonian Misc. Collections 72³: 1-20. Pl. 1-2. 1920.—Under this title two papers are included. The first gives a list of 49 mosses collected by the DÜMMER-MACLENNAN Expedition to Mount Elgon. Descriptive and critical notes are interspersed throughout, and the following new species are described: *Anomobryum robustum*, *Brachymenium stenothecum*, *Brachythecium Dümmeri*, *B. ugandae*, *Bryum brevinerve*, *Dicranoweisia africana*, *Holomitrium Macleennani*, *Neckera submacrocarpa* and *Raphidostegium elgonense*. In addition *Braunia brachytheca* is proposed as a new subspecies of *B. secunda* (Hook.) B. S. G. The second paper is based on a collection of 8 species made by A. Y. ALLAN in the Aberdare Mountains, near Mount Kenia. The only new species listed is *Kleioweisiopsis denticulata*, which represents the type of a new genus, placed somewhat doubtfully in the Pottiaceae. With a single exception all the new species described are illustrated by habit drawings or by magnified drawings of some of the parts.—S. F. Blake.

1973. DIXON, H. N., AND W. W. WATTS. Mosses. Australasian Antarctic Exped. Sci. Rept. Series C. 7¹: 1-9. 1918.—The collection reported upon was made by C. T. HARRISON and S. E. JONES on "Queen Mary's Land, which is situated on the Antarctic Circle between 90° and 100° E. longitude." The following 5 species are listed: *Ceratodon purpureus* (L.) Brid., *Sarconeurum glaciale* (H. f. W.) Card. & Bryhn, *Grimmia fastigiata* Card., *G. stolonifera* C. M., and *Bryum antarcticum* H. f. W. Under the *Bryum* 5 antarctic species, most of which were proposed by CARDOT, are cited as possible synonyms.—A. W. Evans.

1974. HUSNOT, T. Deux hépatiques nouvelles. [Two new hepatics.] Rev. Bryologique 47: 26-27. 19 fig. 1920.—Two new French species of Hepaticae, collected by the author, are described and figured, the first being *Cephaloziella subglobosa* from the department of Calvados and the second *Lophozia Corbieri* from the department of Orne.—A. W. Evans.

1975. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre Fissidens. [Observations on certain species of the genus Fissidens.] Rev. Bryologique 47: 17-18. 1920.—This paper is the continuation of a series the earlier parts of which have already been abstracted. (See Bot. Absts. 5, Entry 628; 6, Entry 158.) In the present part the relationships of the British *Fissidens Lylei* Wils. are discussed, and the conclusion is reached that it is more closely allied to *F. exilis* Hedw. than to *F. exiguus* Sulliv. Whether it represents a distinct species or a form of *F. exilis* is left undecided.—A. W. Evans.

1976. POTIER DE LA VARDE, R. Stereophyllum Bremondii Thér. et P. de la V. (Espèce nouvelle du Cambodge). [Stereophyllum Bremondii (a new species from Cambodia).] Rev. Bryologique 47: 19-20. 2 fig. 1920.—Under the above name a new species from Cambodia in French Indo-China, collected by DE BRÉMOND D'ARS, is described. It is related to *S. Blateri* Card., from the vicinity of Bombay, and anatomical details of both species are figured.—A. W. Evans.

1977. POTIER DE LA VARDE, R. Tératologie. Rev. Bryologique 47: 20-21. 2 fig. 1920.—A moss-seta of *Bryum Donianum* Grev. bearing two capsules united at the base is described and figured. Each capsule shows a typical external peristome with 16 teeth.—A. W. Evans

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS,
BACTERIA, AND MYXOMYCETESH. M. FITZPATRICK, *Editor*CARLOS CHARDON, *Assistant Editor*

FUNGI

1978. BULLER, A. H. R. Three new British Coprini. Trans. British Mycol. Soc. 6: 363-365. 1920.—*Coprinus echinosporus* Buller is described as a new species and *C. bisporus* Lange and *C. curtus* Kalchbr. are described as new to England.—W. B. McDougall.

1979. CLINTON, GEORGE P. Moldy unsalted butter. Connecticut [New Haven] Agric. Exp. Sta. Bull. 222. 400-404. 1920.—The following fungi were found on butter samples: *Mucor* sp., *Alternaria* sp., *Penicillium roquiforti*, *Oidium lactis*, *Epicoccum* sp. Brief reference to the literature is given.—Henry Dorsey.

1980. COKER, W. C. Notes on the lower Basidiomycetes of North Carolina. Jour. Elisha Mitchell Sci. Soc. 35: 113-182. Pl. 23 (in color) and 30-67. 1920.—Author treats three species of *Gymnosporangium*, one of *Auricularia*, one of *Saccoblastia*, two of *Platyglœa*, three of *Septobasidium*, one of *Sirobasidium*, and species of *Eridia*, *Naematelia*, *Tremella*, *Tremellodon*, *Tremellodendron*, *Eichleriella*, *Sebacina*, *Dacryomyces*, *Dacryomitra*, *Dacryopsis*, *Guepinia*, *Ditiola*, and *Calocera*. Of these, those reported as new are: *Saccoblastia ovispora* var. *caroliniana*, *Platyglœa caroliniana*, *Platyglœa Lagerstroemiae*, *Eridia Beardsleei* Lloyd, *Naematelia quercina*, *Tremella aspera*, *T. carneoalba*, *T. subanomala*, *Dacryomyces Ellisii*, *D. pallidus*, *D. fuscominus*, *Dacryopsis ceracea*, *Ditiola albizziae*, *Calocera cornea* var. *minima*. *Eridia pedunculata* B. & C. is shown to be a *Dacryomyces*. Of the genera treated, *Saccoblastia*, *Platyglœa*, and *Sirobasidium* have not been reported before from North America.—W. C. Coker.

1981. COKER, W. C., AND J. N. COUCH. A new species of *Achlya*. Jour. Elisha Mitchell Sci. Soc. 36: 100-101. 1920.—*Achlya Orion* is described. It is nearest apparently to *A. polyandra* Hildb.—W. C. Coker.

1982. ELLIOTT, JESSIE S. BAYLISS. On the formation of conidia and the growth of the stroma of *Daldinia concentrica*. Trans. British Mycol. Soc. 6: 269-273. Pl. 6. 1920.—Observations and cultural experiments covering more than five years show that the conidial form of *Daldinia concentrica* is a *Botrytis* and is common on ash logs. The zoning so characteristic of the perithecial stroma is due to the formation of successive layers of perithecia. The formation of perithecia begins when the stroma is only 3 or 4 mm. in diameter but only those of the last formed zone reach maturity. Spore discharge from mature perithecia continues for several weeks, the asci coming up to the orifice one at a time and discharging their spores.—W. B. McDougall.

1983. ELLIOTT, JESSIE S. BAYLISS. Studies in Discomycetes II. Trans. British Mycol. Soc. 6: 263-268. Pl. 6. 1920.—In addition to descriptions of five other species and varieties *Phoma conicola* and *Mollisia Populi* are described as new.—W. B. McDougall.

1984. ELLIOTT, W. T., AND JESSIE S. ELLIOTT. The sequence of fungi and Mycetozoa. Jour. Botany 58: 273-274. 1920.—An oak tree blown down by a gale in 1912 was observed to note the sequence of fungi growing upon it. The fungi were as follows, appearing in the order given: *Bulgaria polymorpha*, *Coryne sarcoides*, *Stereum hirsutum*, *Panus stypticus*, *Hypholoma fascicularis*, *Phlebia merismoides*, *Hypholoma sublateritium*, *Pluteus cervinus*. The slime mould *Physarum nutans* appeared in 1919, followed by *Stemonitis fusca*. The mycetozoa occupied the place formerly occupied by *Bulgaria polymorpha* and *Coryne sarcoides*, which disappeared in 1916 and 1917 respectively.—K. M. Wiegand.

1985. ROSEN, H. R., AND R. S. KIRBY. A comparative morphological study of aecia of four different rusts found upon barberries in North America. *Phytopath.* 9: 569-573. 2 pl., 1 fig. 1919.—This is a comparative study of the aecial stage of *Puccinia graminis*, *P. oxalidis*, *P. fendleri*, and *Aecidium butlerianum* occurring on the various species of *Berberis* in North America.—J. G. Dickson.

1986. SEARLE, G. O. Some observations on *Erysiphe Polygoni* DC. *Trans. British Mycol. Soc.* 6: 274-293. 1920.—Out of seventy-seven varieties of swedes, turnips, and rape none were found immune to *Erysiphe Polygoni* though the swedes were attacked more vigorously than the turnips. The form of *Erysiphe Polygoni* attacking *Brassica campestris* and *B. oleracea* is a biologic form with the additional distinction that inoculations from *B. campestris* to *B. oleracea* invariably give "subinfections" as a result. "Subinfections" were observed in the field on varieties of *B. oleracea* and were found to survive the winter and in some cases to grow into full infections. Conidia were shown by inoculation experiments to be viable. A probable method of over-wintering of the fungus on cultivated species of *Brassica* is by means of "subinfections" on varieties of *B. oleracea* aided by persistent mycelium on varieties of *B. campestris*.—W. B. McDougall.

1987. SMITH, A. LORRAIN. A drain-blocking fungus. *Trans. British Mycol. Soc.* 6: 262-263. 1920.—*Fomes ulmarius* was found in, and completely closing, a drain-pipe 30 feet below ground.—W. B. McDougall.

1988. SMITH, A. LORRAIN. *Pimina parasitica* Grove. *Trans. British Mycol. Soc.* 6: 295-296. 1920.—*Pimina parasitica* Grove is identical generically if not specifically with *Urophiala mycophila* Vuill. Vuillemin believes that Grove's genus should be discarded because of its very imperfect description. If this contention is accepted, Grove's species becomes *Urophiala parasitica*; if the genus *Pimina* is accepted then Vuillemin's species becomes *P. mycophila*.—W. B. McDougall.

1989. STONE, R. E. Upon the audibility of spore discharge in *Helvella elastica* (Bull.). *Trans. British Mycol. Soc.* 6: 294. 1920.—The puff of spores from fruit-bodies of *Helvella elastica* was found to be accompanied by a distinct hissing sound which could be heard at a distance of five or six feet from a covered basket containing the fungi.—W. B. McDougall.

1990. STONE, R. E. Upon the visibility of spore dissemination in *Fomes pinicola* (Swartz.) Fr. *Trans. British Mycol. Soc.* 6: 293. 1920.—By taking a position such that the fungus was between the observer and the sun, clouds of spores were seen streaming from the under side of a fruit-body of *Fomes pinicola*.—W. B. McDougall.

1991. WAKEFIELD, E. M. The Baslow foray. *Trans. British Mycol. Soc.* 6: 239-247. 1920.—The twenty-third annual Fungus Foray, which was held at Baslow, Derbyshire, from September 22 to September 27, 1919, is described and a complete list of the fungi gathered, numbering 391 species, is given.—W. B. McDougall.

LICHENS

1992. MERESCHKOVSKY, C. Note sur quelques *Ramalina* de la Russie. [New forms of *Ramalina* from Russia.] *Bull. Soc. Bot. Genève* 11: 151-153. 1 fig. 1919.—The characteristics of the following forms are indicated: *Ramalina pollinaria* (Westr.) Ach. form *elegantella* Mer., *R. pollinaria* (Westr.) Ach. form *conglobata* Mer., and *R. calicaris* (L.) Fr. var. *taurica* Mer. forms *macrocarpa* and *tenella*.—W. H. Emig.

1993. MOREAU, FERNAND. Les différents aspects de la symbiose lichénique chez le *Ricasolia herbacea* DN. et le *Ricasolia amplissima* Leight. [The different aspects of lichen symbiosis in *Ricasolia herbacea* and *R. amplissima*.] *Compt. Rend. Acad. Sci. Paris* 170: 1401-1404. Fig. 1-4. 1920.—In *R. herbacea* tubercles are produced on the lower surface of

the thallus by hyphae enveloping algal cells. Frequently the algae in these tubercles are completely consumed by the fungus. In *R. amplissima* there are similar tubercles, but in some cases they enlarge to such an extent that they push up through the cortical layer and form a much branched protuberance on the upper surface of the thallus. In this case the symbiosis is harmonious.—*C. H. Farr.*

1994. PAULSON, R., AND S. HASTINGS. The relation between the alga and fungus of a lichen. Jour. Linn. Soc. London Bot. 44: 497-506. Pl. 21-22. 1920.—A study to determine the frequency of penetration of the algal cells of lichens by the fungus hyphae. Several common British species were examined thoroughly. Only two forms of contact between hypha and gonidium were noted:—gonidium surrounded by loosely applied hyphae; hypha modified in shape so as to present considerable surface to the gonidium to which it is intimately applied. No penetration of living gonidia by hyphae was found. The gonidia do not increase vegetatively, but produce "autospores," daughter gonidia, usually 8 or 16, within the mother cell. The wall of the latter is dissolved. The protoplast of the gonidium is described. Many gonidia die, apparently because of "crowding together and lack of air," and the contents of such cells are absorbed by the fungus hyphae, often without penetration of the wall. The alga in the lichens studied is probably a species of *Chlorella*.—*A. J. Eames.*

1995. SMITH, A. LORRAIN. Lichens of the Baslow foray. Trans. British Mycol. Soc. 6: 252. 1920.—A brief report on the lichens found in the vicinity of Baslow, Derbyshire, in September 1919. Lichens were found to be scarce here because of the smoke from neighboring towns.—*W. B. McDougall.*

BACTERIA

1996. ALBERT, HENRY. A classification of diphtheria bacilli based on the toluidin blue-iodine method of staining. Amer. Jour. Public Health 10: 936-939. 5 fig. 1920.—The author claims that the toluidin blue-iodine method of staining gives a more reliable estimate of the virulence of diphtheria bacilli than any other method, and presents a classification of the bacteria based on their staining reactions with this stain.—*C. A. Ludwig.*

1997. ALBERT, HENRY. Diphtheria bacillus stains with a description of a "new" one. Amer. Jour. Public Health 10: 334-337. 1920.—The author notes defects in results obtained with several stains already in use and describes a new one which he thinks better than any of the others.—*C. A. Ludwig.*

1998. EPSTEIN, ALEXANDRE. Un nouvel agent destructeur des polysaccharides complexes: *Pseudomonas polysaccharidum* (n. sp.). [A new organism which breaks up complex polysaccharides: *Pseudomonas polysaccharidum* n. sp.] Bull. Soc. Bot. Genève 11: 191-198. 1919.—This new bacterium was obtained as a contamination on an artificial medium. The following carbohydrates were changed by it: glucose, galactose, maltose, lactose, dextrin, and starch.—*W. H. Emig.*

1999. JORDAN, EDWIN O. Biology of the Pfeiffer bacillus. Amer. Jour. Public Health 10: 648. 1920.—Certain cultural reactions of the Pfeiffer bacillus are mentioned by means of which it can be differentiated from certain other organisms.—*C. A. Ludwig.*

2000. KELLY, F. B. On the solution of pneumococci by bile. Amer. Jour. Public Health 10: 708-712. 1920.—The author finds that the lytic action of bile and its different preparations on pneumococci and the resistance of pneumococci to lysis by bile are variable. "If a coccus dissolves it is undoubtedly a pneumococcus; but if a solution is only partial, this fact does not necessarily rule out the possibility of the strain belonging to this group.—*C. A. Ludwig.*

2001. MUEER, THEODORE C., AND ROBERT L. HARRIS. Value of brilliant-green in eliminating errors due to the anaerobes in the presumptive test for *B. coli*. Amer. Jour. Public

Health 10: 874-875. 1920.—The claim is made that the production of more than 10 per cent of gas in brilliant-green lactose bile would seem to be no longer a "presumptive," but a "positive" test for *B. coli*. The medium is composed of 50 grams dried oxgall, 10 grams peptone, 10 grams lactose, and 0.1 gram brilliant-green (commercial salt of tetraethyldiaminotriphenyl-carbinol) to 1 liter of water.—*C. A. Ludwig*.

MYXOMYCETES

2002. ELLIOTT, W. T., AND JESSIE S. ELLIOTT. The sequence of fungi and mycetozoa. Jour. Bot. 58: 273-274. 1920.—See Bot. Absts. 7, Entry 1984.

2003. FERDINANDSON, C., AND Ö. WINGE. Clathrosorus, a new genus of Plasmodiophoraceae. Ann. Bot. 34: 467-469. 1 pl. 1920.—A description is given of a myxomycete parasitic on the bluebell, *Campanula rapunculoides*, in Denmark. The cytological features of the parasite are in close agreement with those of the Plasmodiophoraceae. The mature sorus is irregular or rounded, and is traversed by cavities. The individual spores are not so firmly connected as in *Sorosphaera*. The spores at maturity show a finely punctate, warty membrane, and in this characteristic differ from all other known genera of the Plasmodiophoraceae. A diagnosis of the new genus and species is given.—*W. P. Fraser*.

2004. LISTER, GULIELMA. Mycetozoa found during the Baslow foray. Trans. British Mycol. Soc. 6: 248-252. 1920.—The myxomycetes found in the vicinity of Baslow, Derbyshire, in September, 1919, are reported with brief notes on the habitats of a number of species. A total of 45 species was collected.—*W. B. McDougall*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

2005. BOWER, F. O. The earliest known land flora. Nature 105: 681-684, 712-714. 5 fig. 1920.—(Discourse delivered at the Royal Institution, Apr. 30.) A review of some general features of Carboniferous and Devonian plants. Description and discussion of *Sporogonites*, possibly an early Devonian bryophyte; also of *Rhynia* and *Asteroxylon* described by KIRSTON and LANGE from the Rhynie chert in Scotland. Psilotaceae, a group of living pteridophytes with imperfect morphological differentiation, is discussed.—*O. A. Stevens*.

2006. CARPENTIER, A. Notes d'excursions paléobotaniques a Chalonnnes et Montjean (Maine-et-Loire). [Notes on paleobotanical collections from Chalonnnes and Montjean, Maine and Loire.] Bull. Soc. Géol. France IV, 19: 262-272. Pl. 7-8. 1920.—From the Devonian schistes of Chalonnnes the author records various undeterminable scraps and specimens of *Psilophyton spinosum* Potonié and Bernard. From the lower Carboniferous (Culm) are recorded *Lepidodendron acuminatum*, *Stigmaria ficoides*, *Pinnularia mollis*, *Archaeocalamites scrobiculatus*, *Sphenopteris hochstetteri*, *Sphenopteris schimperiana* (?), *Archaeopteris pachyracha* and *Pteridorachis*. From the Lower Carboniferous of Montjean are recorded *Archaeocalamites scrobiculatus*, *Paleoastachya*, *Lepidodendron selaginelloides*, *Lepidophyllum lanceolatum*, *Ulodendron minus*, *Sphenopteris elegans*, *Sphenophyllum tenerrimum*, *Sphenopteris dissecta*, *Zeilleria moravica*, *Asterophyllites*, *Dactylothea aspera*, *Pecopteris plumosa*, *Lepidostrobus variabilis*, *Calymmatotheca andegavensis* and *Telangium affine*.—*E. W. Berry*.

2007. CHURCH, A. H. Thallassiophyta and the sub-aerial transmigration. Oxford Bot. Mem. 3. 95 p. 1919.—A speculation on the origin of land plants. The author considers that life originated through the action of radiant energy acting on ionized sea water on a gradually cooling earth. The first stage of life is termed the Plankton stage. With the shallowing of the supposed universal primeval ocean and the approach of the bottom within the influence of the sunlight the second, or Benthonic stage, was inaugurated. During this long continued stage of evolution a great variety of marine life was differentiated including all of those structures that

the land plants have as a part of their inheritance, e.g., archegonia, alternation of sporophyte and gametophyte generations, etc. By the progressive lifting of the densely populated sea-bottom, especially in regions of tropical temperatures and abundant insolation, the beginnings of the subsequent land flora were differentiated from different algal types. It follows that the different lines of terrestrial plants are only indirectly related through their algal ancestors, that is, they are strictly polyphyletic, and some, such as the Lycopodiales, are considered to have had an independent ancestry from the Plankton stage. The various characters that tie the vascular plants together are thus considered as the results of their like physiologic experience in passing from a dense medium, poor in oxygen and light and rich in nutrient salts, into a rare medium with abundant oxygen and light, but deficient in nutrient salts and water. The author considers that such a form as *Chara* points the way but failed at the time of the transmigration by having lacked a diploid phase to produce wind dispersed spores. The Florideae failed to pass the test by reason of their inefficient cellular organization and the Phaeophyceae by reason of their never having attained fertilization in situ.—*E. W. Berry.*

2008. DOLLFUS, G. F., ET P. H. FRITEL. Catalogue raisonné des Characées fossiles du Bassin de Paris. [Critical enumeration of the fossil Characeae of the Paris Basin.] Bull. Soc. Géol. France IV, 19: 243-261. Fig. 23. 1920.—A critical discussion, with illustrations, of the species of *Chara* founded upon stems and oogonia and recorded from the Tertiary deposits of the Paris Basin. Twenty species and varieties are recognized and these are distributed chronologically as follows: Lower Eocene—Thanetian 2, Sparnacian 6; Middle Eocene—Lutetian 3, Auversian 2; Upper Eocene 5; Lower Oligocene 3; Upper Oligocene 5.—*E. W. Berry.*

2009. FRITEL, P. H. Sur l'existence de l'Éillette: *Papaver somniferum* var. *nigrum* D. C., en Provence, à l'époque quaternaire. [On the existence of the poppy, *Papaver somniferum* var. *nigrum*, in the Pleistocene of Provence.] Compt. Rend. Soc. Géol. France 15: 186. Nov. 22, 1920.—Records a fossil capsule, identical with that of the existing form, from the Pleistocene of Ayalades in southeastern France.—*E. W. Berry.*

2010. HOLMSEN, GUNNAR. Naar invandret granskogen til Kristianiatrakten? [Does the immigrated spruce reach vicinity of Kristiania?] Tidsskr. Skogbruk 28: 165-171. 1920.—Data and discussion bearing on the time at which Norway spruce, *Picea excelsa*, immigrated to certain parts of Norway. The evidence is furnished by the number of spruce pollen grains found in swamp strata. The spruce came after the Stone Age and before the Bronze Age, the latter being fixed at about 1800 B.C.—*J. A. Larsen.*

2011. KRYSHTOFOVICH, A. A. Cycadean trunk from Hokkaidō. Jour. Geol. Soc. Tokyo 27: 1-8. Pl. 19. 1920.—Describes from a photograph of a trunk and from microphotographs of histological preparations, a new species of cycad trunk, *Cycadeoidea ezoana*, from the Cretaceous of Hokkaidō, Japan. The features are not especially distinct but the specimen is of unusual interest in indicating a new locality for petrified trunks, and the only known one throughout the vast expanse of Asia except for vague references to the occurrence of similar forms in the upper Gondwana series of India.—*E. W. Berry.*

2012. REID, E. M. On two preglacial floras from Castle Eden (County Durham). Quart. Jour. Geol. Soc. London 76: 104-144. Pl. 7-10. 1920.—From disturbed clays beneath the Boulder Clay on the Durham coast the author records 125 species of seeds. Part of the collection, comprising 11 species, are all still-existing temperate British forms and are considered as of uppermost Pliocene in age and younger than the Cromerian (many regard the Cromerian as post Pliocene and the English representative of the first Interglacial). The balance, with many exotic forms, are considered as coming from about the middle of the Middle Pliocene. The most abundant form is *Potentilla argentea*; next come a species of *Erica*, two of *Ranunculus*, and an extinct *Melissa*. The trees and shrubs include *Liquidambar*, *Carpinus* (a Japanese form), *Betula*, *Alnus*, *Crataegus*, *Rubus*, *Ilex*, *Rhus*, *Aralia*, *Erica*, *Solanum*, and *Spiraea*. The environment is pictured as an upland valley with steep hillsides, partly

open and partly forested. The land stood 400 to 500 feet higher than now and the sea was some distance away. Sixty-four per cent of the forms are exotic or extinct, and 31 per cent are Chinese or North American. Two species of *Crataegus*, one of *Potentilla*, and one each of *Rhus*, *Ilex*, and *Melissa* are described as new.—*E. W. Berry.*

2013. REID, E. M. A comparative review of Pliocene floras, based on the study of fossil seeds. *Quart. Jour. Geol. Soc. London* 76: 145-161. 1920.—Amplifying a previously expressed theory the author adds weight to the conception that late Tertiary times witnessed the existence and gradual extinction in western Europe of the Tertiary Holarctic flora, or one closely allied to that still existing in the uplands of North America and eastern Asia. It was only in these two regions that the Pliocene flora was enabled to survive glaciation because of the absence of barriers to their southward retreat and subsequent northward advance. Gradual refrigeration of the climate during the Pliocene is an essential part of the picture.—By taking accurately determined seeds from the fossil floras known as the Pont-de-Gail, Reuverian, Castle Eden, Teglian and Cromerian, and determining the percentages of exotic and extinct species and the percentages of Chinese and North American forms the author plotted a curve which is regular both for the exotic element and for the North American-Chinese part. According to this method the Pont-de-Gail (Cantal) and Reuverian (Dutch-Prussian border) floras are Lower Pliocene; the Castle Eden (Durham) flora is Middle Pliocene; the Teglian (Dutch) flora is lower Upper Pliocene and the Cromerian (S. E. England) flora is uppermost Pliocene. Lists of species for each are given.—*E. W. Berry.*

2014. SEWARD, A. C. The oldest land-vegetation. *Scientia* 28: 157-164. Sept., 1920.—A general sketch with especial mention of the Devonian plants *Rhynia*, *Hornea*, and *Asteroxylon* described recently by KIDSTON and LANG, and a brief account of CHURCH's speculation on the origin of land plants.—*E. W. Berry.*

2015. SEWARD, A. C., AND A. SAHNI. Indian Gondwana plants: A revision. *Mem. Geol. Surv. India N. S.*, 7¹: 1-54. Pl. 1-7. 1920.—An account of a restudy of old collections from various horizons in the Gondwana beds of India. From the lower Gondwana, of Permo-Carboniferous age, 16 plants are described. These are all old forms with the exception of a new species of *Samaropsis*, but several taxonomic changes are suggested: *Noeggerathiopsis* is definitely referred to *Cordaite*s; the new genus *Buridia* is proposed for a form which FEISTMANTEL described as *Voltzia*; a probable *Araucaria*, which was described by Zeiller as *Fraucarites*, is made the basis of the new genus *Morania*; and the new genus *Barakaria*, of unassigned affinity, is erected for what FEISTMANTEL called *Cyclopitys dichotoma*. Thirty-one plants are recorded from various horizons of the upper Gondwana, of Jurassic age. These comprise Lycopodiales 1, Filicales 3, Cycadophytes 15, Ginkgoales 2, Araucariaceae 3, Taxaceae 1, and 6 conifers of uncertain relationship. A variety of *Otozamites* and a species of *Nilsonia* are described as new, and *Cycadites constrictus* Feistmantel is transferred to the genus *Torreyites*. Several epidermal and stomatal preparations are described, many of the old types are illustrated by new and better figures, and several are figured for the first time.—*E. W. Berry.*

2016. STOPES, MARIE C. *Bennettites Scottii*, sp. nov., a European petrification with foliage. *Jour. Linn. Soc. London Bot.* 44: 483-496. Pl. 19-20, fig. 1-4. 1920.—A description of a small and very young specimen of *Bennettites* with fairly well preserved bud-leaves. Three types of rameta occur on these leaves. No fruit is present. There is evidence that the specimen is a "sproutling." It is described as *B. Scottii*.—*A. J. Eames.*

PATHOLOGY

G. H. COONS, *Editor*C. W. BENNETT, *Assistant Editor*

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

2017. CLINTON, GEORGE P. **New or unusual plant injuries and diseases found in Connecticut, 1916-1919.** Connecticut [New Haven] Agric. Exp. Sta. Bull. 222. 404-482. 1920.

2018. DANA, B. F., AND GEO. L. ZUNDEL. **Head smut of corn and sorghum.** Washington [State] Agric. Exp. Sta. Popular Bull. 119. 8 p., 4 fig. 1920.—Reports the first occurrence of head smut (*Sphacelotheca reiliana*) on corn from Washington. A discussion of symptoms and effects is followed by a comparison of head smut and common smut.—F. D. Heald.

2019. PEYRONEL, BENIAMINO. **Un interessante parassita del lupino non ancora segnalato in Italia: *Blepharospora terrestris* (Sherb.) Peyr.** [A parasite of lupine newly found in Italy.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29¹: 194-197. 1920.—A new disease of *Lupinus albus*, from the vicinity of Lake Regillo, was found to be readily communicated to healthy plants from diseased plants when both were placed in the same pot in saturated soil. The fungus appeared to be identical with *Phytophthora terrestris* Sherbakoff. The author places the fungus in the genus *Blepharospora*, however, because it resembles so closely *B. cambivora* of Petri, whence *Blepharospora terrestris* (Sherb.) new comb.—F. M. Blodgett.

2020. SANDERS, J. G. **The European potato wart disease discovered in Pennsylvania.** Monthly Bull. California State Commission Hort. 8: 10-12. 1919.—The potato wart disease, (*Chrysophlyctis endobionica*), introduced from Europe, was discovered in Pennsylvania in 1910. The disease manifests itself in the form of warty growths which rapidly multiply until they cover the entire potato. The heavy-celled winter spores resulting from the decay of the infected tuber remain visible and dangerous in soil for at least 6-8 years; control therefore requires a considerable term of years of crop rotation in the absence of potatoes, for it seems the disease attacks only the potato plant.—E. L. Overholser.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

2021. DORAN, WM. L. **The minimum, optimum and maximum temperatures of spore germination in some Uredinales.** Phytopath. 9: 391-401. 1 fig. 1919.—Experiments were conducted to determine the critical temperatures for the germination of aeciospores of *Gymnosporangium clavipes*, urediniospores of *Puccinia antirrhini*, teliospores of *Puccinia malvacearum*, and urediniospores of *Uromyces caryophyllinus*. The minimum, optimum, and maximum temperatures (Centigrade) based on the number of spores germinating (listed in the above order) are: 5, 12, and 19; 8, 14, and 25; 9, 16, and 29; 5, 10, and 20; 3, 14, and 30; and 4, 14, and 29 respectively.—J. G. Dickson.

2022. DRECHSLER, CHARLES. **Cotyledon infection of cabbage seedlings by *Pseudomonas campestris*.** Phytopath. 9: 275-282. 6 fig. 1919.—When cabbage seeds were planted in greenhouse soil heavily infested with the black rot organism, the infection was confined to the region along the sinuses at the margins of the cotyledons. The bacteria invaded through stomata located on the edge of, or a slight distance back of, the sinus. Subsequent progress of the organism is similar to that previously described in older plants by SMITH. Cavities develop most rapidly in the stem near the attachment of the cotyledons. No evidence of infection by way of the roots was secured. There was no indication of secretion by the parasite of a soluble toxic substance capable of diffusing for even very slight distances. Guttation drops were formed only along the sinuses of the cotyledons; infection was readily secured by inoculation of these drops with the organism.—J. C. Walker.

2023. GIDDINGS, N. J., AND ANTHONY BERG. A comparison of the late blights of tomato and potato. *Phytopath.* 9: 209-210. 1 pl. 1919.—A preliminary report upon the pathogenicity of three strains of *Phytophthora infestans* isolated from potatoes (2 strains) and tomatoes (1 strain). The strain from tomato showed greater pathogenicity for young tomato plants than did either of the two strains from potato. Sporulation of the potato strains occurred very sparingly on the spots produced on the tomato leaves.—G. H. Coons.

2024. MACMILLAN, H. G. Wind, and the distribution of pathogenic soil organisms. *Phytopath.* 9: 471-474. 2 fig. 1919.—A hypothetical discussion of the relation of dust storms to the distribution of soil organisms.—J. G. Dickson.

2025. PANTANELLI, E. Contributi alla biologia della peronospora della vite. [The biology of the peronospora of the vine.] *Rev. Patol. Veg.* 10: 51-72. 1920.—In studying the conditions favorable for the infection of the grape by *Plasmopara viticola*, it was found that soil moisture and humidity of the air both have an influence on the stomatal openings. If the soil moisture is below 15 per cent the stomata do not open unless the humidity of the air is above 80 per cent. If the soil moisture is above 20 per cent, the stomata open, provided the humidity of the air does not go below 40 per cent. The condensation of water on the foliage has an action opposed to that of the soil. The higher humidity of the air also favors attacks by the fungus because of its effect on the composition of the leaves, the latter having under these conditions a higher proportion of soluble carbohydrates, nitrogen, and phosphorus. That the stomates are closed in young leaves is held to be a sufficient reason why infection does not commonly take place; these young organs also contain little sugar and starch, and nitrogenous compounds soluble in water are almost completely absent. No close parallelism was found between the concentration of the cell sap and receptivity, though increase of turgescence seemed to be favorable to the fungus. A study was made of the chemotactic influence of various substances on the zoospores. Analyses of spots in the leaf showed that in the oily spots the starch had decreased but that there had been an increase in a zone surrounding the spots over that in the rest of the leaf. The percentage of sugar had decreased in the spots also, but the surrounding zone and the rest of the leaf had the same sugar content. Studies were made of the nutrition of the fungus in the leaf. Bibliography appended.—F. M. Blodgett.

2026. REDDICK, DONALD, AND V. B. STEWART. Transmission of virus of bean mosaic in seed and observations on the thermal death-point of seed and virus. *Phytopath.* 9: 445-450. 1919.—Hypodermic injections of juice from mosaic bean plants failed to produce disease in beans although high percentage of infection was obtained by rubbing juvenile leaves with crushed diseased leaves. The disease is not readily communicated from plant to plant by ordinary contact. Seeds from diseased plants immersed for 4 hours in bleaching powder solution gave 50 per cent of mosaic plants. Dry heat treatments ranging from 60 (1 to 24 hrs.) to 80°C. (10 min.) failed to kill the virus, although the higher temperature injured the viability of the seeds. Moist heat (70°C. for 15 min.), although reducing germination markedly, did not kill the virus.—G. H. Coons.

2027. SNELL, WALTER H. Observations on the relation of insects to the dissemination of *Cronartium ribicola*. *Phytopath.* 9: 451-464. 1919.—The author gives a list of species of insects bearing aeciospores in varying quantities found in June, 1919, on or near blister rust lesions on *Pinus Strobus*, and a list of insects bearing urediniospores found in 1918 on *Ribes* bushes. The author concludes that while the spread of *Cronartium ribicola* by insects from pine to *Ribes* or vice versa may be infrequent and accidental, the spread of the uredinial stage upon *Ribes* probably occurs with some regularity.—J. G. Dickson.

2028. TAYLOR, MINNIE W. The overwintering of *Cronartium ribicola* on *Ribes*. *Phytopath.* 9: 575. 1919.

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY)

2029. BAKKE, A. L. The comparative rate of desiccation of tubers from normal and diseased potato plants. *Phytopath.* 9: 541-546. 1 fig. 1919.—The moisture losses of Rural New Yorker and Eureka potato tubers from healthy plants and from plants showing the curly-dwarf disease were studied under storage conditions. The tubers from diseased plants on being desiccated reached an equilibrium with the evaporating power of the air sooner than did tubers from healthy plants of the same variety. This increased water loss from diseased tubers was due to the development of fissures in the suberized epidermis. The curly-dwarf tubers when completely dried showed a greater water absorbing capacity than desiccated normal tubers under similar conditions.—*J. G. Dickson.*

2030. SHAPOVALOV, M., AND H. A. EDSON. Wound-cork formation in the potato in relation to seed piece decay. *Phytopath.* 9: 483-496. 3 fig. 1919.—The writers show that sprouting alone does not affect the ability of potato tubers to form cork over wound surfaces, but that the drying or shriveling of the tissues, which usually accompanies germination when in warm storage, checks rapid cork formation over cut surfaces. They further demonstrate the general susceptibility of badly shrunk tubers to attack by decay producing organisms in the soil. The resistance of the seed piece to attacks diminishes in direct proportion to the water loss from the tuber. A shriveled tuber must first imbibe the necessary water from the soil before it is able to initiate cell division; consequently, destructive activities of microorganisms develop so rapidly that formation of the protective cork layer in the shriveled tubers comes too late to check invasion. Proper storage conditions for seed potatoes—a reasonably low temperature and suitable humidity to prevent excessive evaporation—will control the seed piece rot under generally existing conditions.—*J. G. Dickson.*

2031. STOKLASA, JULES. Action de l'acide cyanhydrique sur l'organisme des plantes. [The effect of hydrocyanic acid on the plant organism.] *Compt. Rend. Acad. Sci. Paris* 170: 1404-1407. 1920.—Quantities up to 4 per cent (by volume) of hydrocyanic acid were tested. With *Tilletia tritici*, 1 per cent reduces and 2 per cent strength prevents spore germination. Other microorganisms tried showed greater resistance, e.g., *Bacillus subtilis* and *B. mesentericus vulgatus* which resist 3 per cent and *Aspergillus* which will withstand 4 per cent. *Mucor* and *Penicillium* are killed by 3.5 per cent. This gas is found valuable in disinfecting seeds, as 1 to 2 per cent while reducing infection does not hinder wheat germination. It is necessary to dry the seeds in the open air for 3 days before attempting to germinate them.—*C. H. Farr.*

DESCRIPTIVE PLANT PATHOLOGY

2032. AFONSO, PEDRO CORREIA. Algumas doencas do arroz. [Some diseases of rice.] *Bol. Agric. Nova Goa* [Portuguese East India] 1: 113-128. 7 fig. 1919.—A brief description of certain of the more serious rice diseases of British India which might be introduced with seed grain.—*John A. Stevenson.*

2033. ANONYMOUS. Silver leaf disease. *Jour. Roy. Hort. Soc.* 45: 313-315. 1919.

2034. ATANASOFF, DIMITR. Fusarium-blight (scab) of wheat and other cereals. *Jour. Agric. Res.* 20: 1-32. 1920.—The chief cause of "scab," or headblight, and one of the chief causes of rootrot of the cereal crops in the central and eastern cereal growing regions of the United States is a *Fusarium* known in its ascigerous form as *Gibberella saubinetii*. However, in fewer cases headblight is caused by each of nine other species and rootrot by four other species of *Fusarium*. *Gibberella saubinetii* attacks either the roots, causing rootrot, or the stems and head, causing scab. The present paper deals primarily with the latter condition. A careful description of the blighting of each stage of the host is given. In the case of the blighting of the heads, it was found that the infection was first detected three to four days after

inoculation as small, brown, water-soaked spots on the glumes and that infection proceeds only from the head downward.—Conidia and perithecia are produced in abundance on the attacked parts of the host and the spores may be spread by wind and water. The first natural infection causing the scab, or headblighting, takes place during the latter part of the blossoming period. The secondary infections follow soon after the primary ones and are the more destructive. The fungus winters over as mycelium and conidia in or on the seed, straw, and soil, and also as undeveloped perithecia.—The ascigerous stage develops in mid-summer on affected plant parts that are kept moist. Development is secured in pure culture on stems of various sorts that are kept uniformly moist.—Rainy and cloudy weather favors blight attacks.—A marked difference in varietal susceptibility occurs among the spring wheats. Red Fife and Marquis are among the most susceptible, while Bluestem is the most resistant.—*R. S. Kirby.*

2035. BRITTELBANK, C. C. **Tomato diseases.** Jour. Dept. Agric. Victoria 18: 413-416. 1920.—Diseases common to tomatoes are described.—*J. J. Skinner.*

2036. CLINTON, GEORGE P. **Dry rot.** Connecticut [New Haven] Agric. Exp. Sta. Bull. 222. 398-400. 1920.—Dry rot fungus, *Merulius lacrymans*, is reported to have destroyed the floor of an unoccupied cottage in a period of 5 years. Two other cases of similar injury are noted. The fungus works only when abundant moisture is present. When the floor was removed and ventilated no further injury was noticed a year after the precautions were instituted.—*Henry Dorsey.*

2037. CUNNINGHAM, G. H. **Fire-blight.** New Zealand Jour. Agric. 21: 137-139. 1920.—Notes concerning the disease, the causal organism [*Bacillus amylovorus*], and the effects of the disease as it occurs in New Zealand.—*N. J. Giddings.*

2038. FOËX. **Quelques causes de degenerescence chez la pomme de terre.** [Some causes of degeneracy of potatoes.] Jour. Soc. Nation. Hort. France 21: 204-207. 1920.—Leaf roll and mosaic assigned as causes of degeneracy of potatoes. Symptoms of these two diseases are briefly described and contrasted. Methods of control such as use of seed from fields free from the diseases and breeding for resistance are recommended.—*H. C. Thompson.*

2039. GOUGH, GEO. C. **Wart disease of potatoes.** Jour. Roy. Hort. Soc. 45: 301-312. 1919.—The fungus causing this disease (*Synchytrium endobioticum*) is thought to have been introduced within the last sixty years, yet it may possibly be indigenous. The disease may be spread by infected seed, tools and implements, and by feeding diseased materials to animals. It is found in every county in England except Suffolk and Cornwall and is obviously spreading, imperiling the future of the potato industry. The use of immune varieties gives some promise of control. A bibliography of ninety numbers is appended.—*J. K. Shaw.*

2040. GREGORY, C. T. **Heterosporium leafspot of timothy.** Phytopath. 9: 576-580. 1919.—A description of a leafspot disease of timothy caused by *Heterosporium phlei* n. sp.—*J. G. Dickson.*

2041. HARTER, L. L., AND J. L. WEIMER. **The surface rot of sweet potatoes.** Phytopath. 9: 465-470. 1 pl. 1919.—The writers describe a surface rot due to a species of *Fusarium* identical morphologically with *Fusarium oxysporum*. Control measures are discussed.—*J. G. Dickson.*

2042. LANDI, RAFFAELE. **Tumori o galle del colletto e delle radici delle piante fruttifere (Crown-Gall).** [Crown-gall of fruit trees.] Rev. Patol. Veg. 10: 87-96. Pl. 1-4. 1920.—Crown-gall caused by *Bacillus tumefaciens* is described as widespread in Italy on a variety of plants, the peach being injured most severely, next the almond tree, the apricot less, and the walnut rarely. An organism was isolated which in agar cultures at 32°C. produced small round, whitish colonies. Similar bacteria were isolated from the galls on the different host plants. Literature referring to this disease in Italy is given.—*F. M. Blodgett.*

2043. LINK, G. K., AND MAX W. GARDNER. **Market pathology and market diseases of vegetables.** *Phytopath.* 9: 497-520. 1919.—A summary of the results of the first year's study of the market pathology of truck crops, carried on in coordination with the Food Products Inspection Service of the Bureau of Markets of the United States Department of Agriculture. Following a listing of typical losses which came to their attention, the authors group the market diseases into two classes. The first comprises the more or less specific and clearly defined diseases, the causal organisms of which have rather narrow host limitations. The second class comprises the diseases not commonly recognized as of importance in the field, the causal organisms of which apparently are not narrowly limited as to host range and do not manifest a high degree of parasitism as based upon virulence under field conditions. A list of important market diseases arranged according to hosts is given.—*J. G. Dickson.*

2044. McCUBBIN, W. A. **The brown rot of stone fruits.** *Bull. Pennsylvania Dept. Agric.* 3^o: 1-8. 1 *pl.*, 1 *fig.* 1920.—In a popular account, brown rot is estimated to cause 15 per cent loss annually in Pennsylvania peaches (crop estimated at 1,000,000 bushels). Because of this disease the transportation problems are more difficult, prices are reduced, picking and marketing are rushed to prevent excessive loss. Sanitation in the orchard, pruning and thinning, clean cultivation and spraying are recommended as field methods for brown rot control. Cooling of the fruit after picking retards loss in marketing.—*C. R. Orton.*

2045. MOLZ, E. **Die Typhula-Fäule der Zuckerrüben auf den Azoren und ihre Bekämpfung.** [Typhula rot of sugar beets in the Azores and its control.] *Zeitschr. Pflanzenkrankh.* 30: 121-139. 1 *fig.* 1-7. 1920.—*Typhula betae* Rostr. causes a destructive rot of sugar beets in the Azores. By means of cultural studies of the causal agent and from field study, author concludes that excessively moist atmosphere favors the parasite. The disease follows injury from the larvae of *Agrotis segetum*, the control of which would also have a beneficial effect on the control of the rot.—*H. T. Güssow.*

2046. PIPER, C. V., AND H. S. COE. **Rhizoctonia in lawns and pastures.** *Phytopath.* 9: 89-92. 2 *pl.* 1919.—The authors describe a disease of the common lawn and pasture plants caused by *Rhizoctonia solani* which results in formation of extensive brown or dead areas in the turf. The disease has been found in several states and is thought to be of general occurrence in lawns and pastures throughout the eastern quarter of the United States. Inoculations in laboratory and field were made to confirm the diagnosis. Disinfection with Bordeaux mixture gave only temporary control; other chemicals (mercuric chloride and sulphur, iron sulphate) were unsatisfactory. Tests with strains of *Agrostis canina* and *Agrostis stolonifera* showed among several very susceptible strains, certain strains of each which were resistant.—*G. H. Coons.*

2047. SORAUER, PAUL. **Manual of plant diseases. I. Non-parasitic diseases.** English translation by FRANCES DORRANCE. 26 x 18 cm., 888 p., 208 *fig.* Printed privately: Wilkes-Barre, 1914-1920.—A translation without deviation from the original.—*D. Reddick.*

2048. VAUGHAN, R. E., AND J. C. WALKER. **Onion smut.** *Wisconsin Agric. Exp. Sta. Circ.* 114. 1919.—Formaldehyde solution (1 ounce to 1 gallon) applied at the rate of 200 gallons per acre controls onion smut when applied to the soil with the seed by using a drip attachment on the seeder.—*R. E. Vaughan.*

2049. ZIMMERMAN, HANS. **Nematodenbefall (Heterodera) an Kartoffeln.** [Nematodes (Heterodera) on potatoes.] *Zeitschr. Pflanzenkrankh.* 30: 139-145. 4 *fig.* 1920.—In Mecklenburg an attack due to nematodes was observed first in 1913. In recent years this trouble has become of more importance in the same locality. Following a description of the course of the disease, such as "rolling of leaves," "drooping, followed by death," author suggests control measures such as rotation, omitting potatoes on infected land for three years, disease free seed, and other methods of sanitation.—*H. T. Güssow.*

ERADICATION AND CONTROL

2050. BARTHE, A. E. *Lucha antiparasitaria*. [Parasite control.] Rev. Agric. Com. y Trab. 3: 256-265. 5 fig. 1920.—A general review of the classes of insect and plant parasites is given with a resumé of different spray materials, machinery, and other control measures.—*F. M. Blodgett*.

2051. BROOKS, F. T. *Plant sanitation in fruit plantations*. Trans. British Mycol. Soc. 6: 253-262. 1920.—Diseased parts of trees and shrubs in or near fruit plantations should be promptly cut off and burned to prevent spread of disease. When a tree is dying back to such an extent that it has to be cut down it is important that the stump be either removed or covered with soil to prevent the development of dangerous fungi. Other suggestions for destroying breeding places of destructive fungi and insects are given.—*W. B. McDougall*.

2052. BUTLER, O., AND T. O. SMITH. *Relative adhesiveness of the copper fungicides* Phytopath. 9: 431-444. 1919.—Following a review and tabulation of previous work on the adhesiveness of Bordeaux mixture, the authors tested various types of Bordeaux and Burgundy mixtures for adhesiveness. Relative adhesiveness was determined by use of sprayed leaves of *Coleus golden bedder* on which the spray was allowed to dry. Half leaf samples were then taken, after which the plants were subjected to rain conditions. Plants were then dried and further samples taken for analysis. Copper was determined by the electrolytic method. The authors find that neutral and alkaline Burgundy mixtures are more adhesive than Bordeaux mixtures and that the alkaline Burgundy mixture is more adhesive than the neutral wash. The adhesiveness of the Bordeaux mixtures decreases with increase in percentage of lime. Within the temperature limits 10 and 30°C., adhesiveness of Bordeaux mixture varies inversely with the degree of deterioration rather than being dependent on the degree of hydration. Deteriorated Bordeaux mixture, having copper sulphate-lime ratio 1:1, is more adhesive than deteriorated Burgundy mixture, probably due to the lime present in the former. The addition of ferrous sulphate decreases adhesiveness of Bordeaux mixture, the addition of Paris green or arsenite of soda does not materially change adhesiveness, and the addition of lead arsenate increases adhesiveness. Casein does not affect adhesiveness of 1:1 Bordeaux mixture. Copper acetates are more adhesive than Bordeaux mixture. The addition of gelatin to normal and basic acetate of copper increases the adhesiveness of these salts. Cuprammonium sulphate is very much more adhesive than Johnson's mixture. "Pyrox" is inferior in adhesiveness to its equivalent 1 per cent Bordeaux 1:1 plus 0.5 per cent arsenate of lead. Climatic conditions prevailing at the time the fungicide is applied affect the adhesive properties of the wash.—*G. H. Coons*.

2053. CHILDS, L. *Spray gun versus rod and dust in apple orchard pest control*. Oregon Agric. Exp. Sta. Bull. 171. 46 p., fig. 1-17. 1920.—The dusting method has been found to control scab and codling-moth in the Hood River Valley, but present known dust materials will not effectively control anthracnose, mildew, leaf-roller, and the various apple aphids. Applications made with a rod are most expensive. Sprays applied with one gun, using a 3½ horse-power machine, are least expensive, although the saving in time resulting from the use of a big machine, together with the fact that a perfect spray is produced with no overload to the machine, makes a big sprayer much more economical and efficient.—*E. J. Kraus*.

2054. HOWARD, W. L. *Circumventing the pear blight*. Monthly Bull. Dept. Agric. California 8: 603-604. 1919.—Bench grafting of Surprise scions upon Japanese seedling pear roots is recommended. By using a long scion and a comparatively short root, the scion may be made to form roots of its own. The Surprise tree on the Japanese root is allowed to grow until desired shape is obtained by pruning during the first two years. The main branches may then be grafted to Bartlett. It is thus impossible for blight to kill more than the branches, which, if attacked, can be cut off and the stumps grafted the next spring.—*E. L. Overholser*.

2055. HYDE, W. C. **Orchard experiments in Stoke district.** New Zealand Jour. Agric. 21: 81-83. 1920.—Experiments for control of peach brown rot, apple leaf hopper, and apple black spot (scab). Four types of spray materials were tested, and several varieties of fruit were included in some of the experiments. Some general conclusions are given.—*N. J. Giddings.*

2056. LOVETT, A. L. **Insecticide investigations.** Oregon Agric. Exp. Sta. Bull. 169. 55 p., fig. 1-12. 1920.—The use of spreaders in conjunction with many poison sprays increases adhesiveness, causing a more even coating of the surface to which they are applied. Arranged in order of commercial desirability some of these spreaders are "caseinate" (a mixture of casein, hydrated lime and water to form a thin paste), gelatin, glue, Irish moss, and soap bark. While miscible oil emulsion may prove a very valuable spreader, it is not definitely recommended at this time. Other substances, such as cane sugar, glycerine, tea made from sage-brush, and gum arabic were also used but with indifferent success. Tests on the use of materials with arsenate sprays to render them non-injurious to foliage, and on the action of nicotine sulphate sprays are reported.—*E. J. Kraus.*

2057. McMURRAN, S. M. **Pecan rosette in relation to soil deficiencies.** Amer. Nut Jour. 10: 38-39, 43. 1919.—Pecan rosette is the most serious trouble to which pecan trees are subject. Earliest stages of disease are indicated by a few small, wrinkled, yellow-mottled leaves at end of branches. Trees are so weakened that they are often killed by winter injury or borer attacks, though they do not die as a direct result of the disease. Deficiency in humus and soil moisture is given as the cause of the disease. Cover crops, especially legumes, are recommended as a remedy. Deep sands and eroded hillsides should be avoided.—*E. L. Overholser.*

2058. McMURRAN, S. M. **Preventing wood rot in trees.** Amer. Nut Jour. 10: 40-41. 1919.—Wood-rotting fungi gain entrance through unprotected wounds on trees and are ultimately the cause of serious losses. In top working, stubs should not be left and sloping cuts should be avoided. Wounds should be covered with waterproof material until healed. The long growing seasons and hot, humid climatic conditions of the southern states are very favorable for development of wood-rotting fungi.—*E. L. Overholser.*

2059. PRITCHARD, F. J., AND W. B. CLARK. **Effect of copper soap and of Bordeaux soap spray mixtures on tomato leaf spot.** Phytopath. 9: 554-564. 7 fig. 1919.—Experiments, based chiefly upon the yield of fruit, are reported in tabular form on the use of different spray materials in controlling leaf spot. The cheap copper soap mixture 0.5-0-3-50 increased the yield as much as Bordeaux. It was not so effective as Bordeaux soap 4-2-3-50 or Bordeaux mixture 4-4-50 in controlling the disease on the foliage under field conditions; but as it increased in yield fully as much as the others it was the most economical of the three spray mixtures.—*J. G. Dickson.*

2060. SIMONETTO, M. **Criterios sobre la destrucción de plagas y de las enfermedades en general de las plantas y de la mosca prieta en particular.** [The destruction of plagues and diseases of plants in general and of the fly (*Aleurocanthus Wöglumi*) in particular.] Rev. Agric. Com. y Trab. 3: 164-169. 1 fig. 1920.

2061. WALTON, R. C. **The control of frog-eye on apple.** Pennsylvania Agric. Exp. Sta. Bull. 162. 39 p., 18 fig. 1920.—Frog-eye, caused by *Physalospora cydoniae*, often causes almost complete defoliation by August in certain parts of Pennsylvania. This results in undersized fruit, loss of vitality, weakened fruit buds, and eventually death of the trees unless protection is afforded.—The reported experiments were conducted upon York Imperial and Stayman Winesap trees in three different orchards during the years 1918 and 1919. Bordeaux mixture, lime-sulphur, "Pyrox," "Sulfocide," and sulphur dust were used. By means of extensive bagging experiments it was found that more than half of the total infection takes place within the period of eighteen days after the petals fall. This is appar-

ently the period of greatest foliage susceptibility of the host. The relations of temperature and precipitation to frog-eye infection are discussed in some detail.—Of the protective materials used, Bordeaux mixture, lime-sulphur, and "Pyrox" proved the most effective in the order named. Bordeaux mixture reduced the infection in per cent to 19.8; lime-sulphur to 21.5; "Pyrox" to 28.5; "Sulfocide" to 65.8; while sulphur dust gave no control. The average infection on all the checks was 79.4 per cent. For the optimum control the fungicide should be applied (1) just before the blossom buds open, (2) when three-fourths of the petals have fallen, (3) two weeks later, (4) about the middle of June. The last application is not necessary for commercial protection. Pruning and the destruction of dead twigs and limbs are regarded as important accessories to spraying.—*C. R. Orton.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE)

2062. ANONYMOUS. **Proceedings of the twelfth annual meeting of the American Association for Cancer Research.** Absts. Bact. 4: 221-223. 1920.—Contains abstracts of the papers presented.—*D. Reddick.*

2063. CHAPMAN, G. H. "Crack-neck:" A non-parasitic disease of chrysanthemums. *Phytopath.* 9: 532-534. 1 pl. 1919.—A description is given of a non-parasitic malady occurring in fancy forced chrysanthemums, with suggested control measures.—*J. G. Dickson.*

2064. DAVIS, D. M., AND E. O. SWARTZ. **The testing of germicidal substances against the gonococcus.** *Jour. Infect. Diseases* 27: 591-601. 1920.—A new method for making germicidal tests with the gonococcus is presented. It consists in mixing in sterile centrifuge tubes 1 cc. of the gonococcus emulsion with 1 cc. of the properly diluted drug to be tested, incubating for 20 minutes in a water bath at 37.5°C., centrifuging, washing with 0.85 per cent NaCl solution, centrifuging again, and finally inoculating liberally, and with a special loop, the washed gonococci upon the surface of ascitic—or hydrocele—fluid agar. If the tubes show no growth at the end of 7 days they are reinoculated with a fresh, viable culture of gonococcus, to prove whether or not enough of the test drug was carried over with the transfer to make the medium unsuitable for growth.—*Selman A. Waksman.*

2065. DAVIS, LEWIS. **Some important factors in the preparation of culture media.** *Amer. Jour. Public Health* 10: 250-254. 1920.—The preparation of culture media is discussed with special reference to the needs of the commoner pathogenic organisms. The importance of peptone is stressed. Its value is dependent on the amount of amino acids and other compounds present in a form utilizable by bacteria. A peptone hydrolyzed to a much greater degree than the one formerly imported has increased nutritive values. Beef infusion is superior to beef extract for the cultivation of pathogenic bacteria, and especially for the production of toxins. The presence of a small quantity of fat in the infusion, however, has a deleterious action, due, probably, to a depression in the surface tension of the medium. Hydrogen-ion concentration is discussed and a general procedure for adjusting it by the colorimetric method is outlined. The steam pressure method of sterilization is favored, but media having a supernatant layer of oil for production of anaerobiosis are perfectly sterilized by the intermittent method.—*C. A. Ludwig.*

2066. HARTLEY, CARL, ROY G. PIERCE, AND GLENN G. HAHN. **Moulding of snow-smothered nursery stock.** *Phytopath.* 9: 521-531. 1919.—The authors describe a mulch injury or snow mould of evergreen nursery stock, the disease also occurring to a less extent on young trees in the forest. The disease can be distinguished by the fact that following the snow or mulch injury, the roots remain healthy for a considerable time. Control measures are suggested.—*J. G. Dickson.*

2067. JONES, L. R., AND M. MILLER. **Frost necrosis of tulip leaves.** *Phytopath.* 9: 475-476. 1 fig. 1919.

2068. MILLER, DAVID. Leaf-stem gall-aphis of the poplar. New Zealand Jour. Agric. 21: 134-135. 1920.—The occurrence of this insect (*Pemphigus populitransversus*) in Central Otago, N. Z., is recorded. The leaf and the root forms were found and life history observations show the habits to be essentially the same as in North America.—N. J. Giddings.

2069. PEYRONEL, BENIAMINO. Alcuni casi di rapporti micorizici tra Boletinee ed essenze arboree. [Some mycorrhizal relations between Boletineae and woody plants.] Staz. Sperim. Agrarie Ital. 53: 24-31. 1920.—A short contribution to the study of ectotrophic mycorrhizae. Mycorrhizal relations were observed between *Larix decidua* and *Boletus elegans*, *B. laricinus*, and *Boletinus claviceps*, and between *Populus tremula* and *Boletus rufus*, by following the mycelial strands through the soil from the fruiting body of the fungus to the root of the higher plant and also by microscopical examination. An extensive literature list is appended.—A. Bonazzi.

2070. STEVENS, NEIL E., AND A. H. CHIVERS. Fanning strawberries in relation to keeping quality. Phytopath. 9: 547-553. 1919.—The authors find that fanning berries after picking, although partially drying the surface and lowering the temperature from 1 to 2°C., does not add appreciably to their keeping quality. The average quantity of sound berries at the end of the storage period in 1919 was 50 per cent for the fanned and 53 per cent for the unfanned. Temperature appears to be the important factor in shipping and storing soft fruits. Berries picked at 16 and 27°C. showed respectively 72 and 51 per cent sound berries. Brief discussion of the fungi causing decaying of ripe berries is given.—J. G. Dickson.

2071. STOKES, WILLIAM ROYAL, AND C. H. DOUTHIRT. Practical disinfection of tuberculous sputum. Amer. Jour. Public Health 10: 973-975. 1920.—The authors cite some experiments which show that prompt effective disinfection of tuberculous sputum depends upon dissolving the matrix of sputum to permit the disinfectant to reach the bacteria.—C. A. Ludwig.

2072. STONE, R. E. Kerosene injury to shade trees. Phytopath. 9: 476-477. 1919.

2073. TILLEY, F. W. Investigations of the germicidal value of some of the chlorin disinfectants. Jour. Agric. Res. 20: 85-110. 1920.—Presentation from the standpoint of general disinfection in animal industry.—“In the present work, considered as a whole, there is seen throughout more or less ‘selective action’ on the part of the various disinfectants. The most clearly defined example of this is seen in the extremely high value of chloramin T against *Staphylococcus aureus* as compared with its extremely low value against *Bacillus pyocyaneus*.”—“The results of the experiments upon anthrax spores show that the germicidal action of chlorin compounds is not always so speedy as is commonly supposed but may extend over several days.”—“The addition of ammonia to solutions of chlorin or hypochlorites very greatly increases germicidal activity and tends to prevent depreciation in value on the addition of organic matter.”—D. Reddick.

2074. VAUGHAN, R. E., AND M. MILLER. Freezing injuries to potato tubers. Wisconsin Agric. Exp. Sta. Circ. 120. 1919.—Popular discussion of frost necrosis.—R. E. Vaughan.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

2075. ANONYMOUS. Agar production in U. S. Spatula 26: 446. 1920.—The production of agar from seaweeds, very abundant along the lower California coast, by modern machinery and methods is now carried on at Glendale near Los Angeles. The production reaches 700 pounds per day. The imports from Japan in 1919 were approximately 250 tons. The use of agar in bacteriology, medicine, and food preparations is constantly increasing.—E. N. Gathercoal.

2076. ANONYMOUS. **Annual Report, Cinchona Department, Madras. 1918-19.** Through Chem. and Druggist 93: 1345. 1920.—Acreage has increased during the year from 1184 to 1348 acres fully stocked with trees. Factory has worked up 707,000 pounds of bark, viz., 12,800 pounds of Java-grown *C. ledgeriana*, 408,520 pounds locally purchased *C. officinalis*, and 285,870 pounds government bark, producing 39,633 pounds of alkaloids. The average analysis was 3.66 per cent of quinine sulphate against 4.59 per cent the previous year. As the supplies from private plantations are decreasing and the government bark does not nearly meet the demand for quinine an urgent appeal is made for extensive new government plantations that India may not be at the mercy of foreign growers in Java.—*E. N. Gathercoal.*

2077. ANONYMOUS. **Camphor cultivation and substitutes.** Chem. and Druggist 93: 1514. 1920.—The camphor tree, *Cinnamomum Camphora*, is now cultivated in California, Florida, Texas, Manila, Malay States, and Mauritius. In California, *Ramona stachyoides*, *Artemisia trifolium*, and *A. frigida* are being cultivated for camphor. The volatile oil of *Ramona stachyoides* contains about 40 per cent of camphor.—*E. N. Gathercoal.*

2078. ANONYMOUS. **Indian industries V—The Mowra tree.** Chem. and Druggist 93: 1410. 1920.—A very valuable economic tree of India is the mowra, *Bassia longifolia*. The flowers are used by millions of people as a food. The seeds furnish an abundant oil, suitable for domestic use and soap manufacture, and are of medicinal value in certain skin diseases. The wood is extensively used for building, turnery and furniture. Because of the complete collection of the seed to supply the local and export demand the number of mowra trees, while very great, is constantly decreasing and an appeal is made for extensive government plantings in the government reserve forests. The seedlings develop rapidly even on stony soil and need only protection from grazing cattle.—*E. N. Gathercoal.*

2079. ANONYMOUS. **The supplement to the French Codex.** Pharm. Jour. 105: 301-302. 1920.—Serum Antidysenteric and Serum Antimeningococcic as well as a number of chemicals and geleniums have been added. Of asafoetida, the permissible residue upon incineration has been raised from 10 to 20 per cent. Balsam of Peru is required to contain by assay from 52 to 56 per cent of cinnamein. Strophanthus in the Codex consisted of the seeds of *S. hispidus* only; now those of *S. Kombe* may also be used and are described.—*E. N. Gathercoal.*

2080. ANONYMOUS. **Les vegetaux aromatiques de Madagascar.** [Aromatic plants of Madagascar.] Schweiz. Apotheker Zeitg. 58: 501-503. 1920.—A brief account is given of the status of the production in Madagascar of Ylang-ylang, Geranium, Clove, Vanilla, Canella, Champaca, Eucalyptus, Pepper, Allspice, Nutmeg. Vanilla is the chief product exported from the island.—*H. W. Youngken.*

2081. ATKINSON, ESMOND H. **Weeds and their identification.** New Zealand Jour. Agric. 21: 115-119. 1 pl. 1920.—Poison hemlock, *Conium maculatum*, is reported as occurring in various localities. The plant is described in detail. Plants of similar appearance are also mentioned and differential characters are given. The poisonous effects are described.—*N. J. Giddings.*

2082. BARGER, GEORGE. **Ergot: its history and chemistry.** Pharm. Jour. 105: 470-473. 1920.—A very complete résumé of the history of ergotism and epidemics caused by ergot, of the medicinal properties of ergot, and of its botanical and chemical history. The chief active principles of ergot are: (a) the amorphous alkaloid ergotoxine, yielding crystalline salts. Physiologically this alkaloid causes such contraction of the arterioles that the blood supply to an organ may in the long run be cut off completely, causing gangrene. Also, it acts on the nervous system producing convulsions. (b) Histamine—a powerful uterine stimulant. (c) Tyramine—the chief blood pressure raising principle. (d) Acetylcholine occurs in ergot and ergot extracts in variable and usually negligible amounts. It lowers blood pressure. A large number of physiologically inert substances, alkaloidal, acid, resinous, and oily in nature, are also isolated from ergot.—*E. N. Gathercoal.*

2083. BRUCE, E. A. **Hydrangea poisoning.** Jour. Amer. Vet. Med. Assoc. 58: 313-315. 1920.—An account is given of the poisoning of a horse from eating *Hydrangea hortensis* var. *otaska*. Experiments with guinea pigs were interpreted as proving the poisonous properties of the plant.—C. D. Marsh.

2084. CABRERA, TEODORO. **El cordobán y sus aplicaciones medicinales.** [Rhoeo and its medical uses.] Rev. Agric. Com. y Trab. 3: 170-171. 2 fig. 1920.—*Rhoeo discolor* is described and is said to be useful as a haemostatic and as a pectoral. Several cases of its successful use for the second purpose are described.—F. M. Blodgett.

2085. CASPARIS, P. **Über einige Volksheilmittel Turkestans.** [On some popular medicaments of Turkestan.] Schweiz. Apotheker Zeitg. 58: 497-501, 512-514. 1 fig. 1920.—The author discusses 21 popular medicaments, samples of which were collected by Dr. WACKER in Turkestan during the world war. These include the fruits of *Helicteres Isora* L. (Fam. Sterculiaceæ), known in Turkestan as "Machmil i Tetschon" and employed in the treatment of diarrhoea and articular disease; the unripe inflorescence of *Piper longum*, known as "Dari Pelpel" and used for headaches; star anise, known as "Badian Kuttaie;" Coriander fruits, which are smoked for headache; Nux Vomica seeds, known as "Gargemorit" or "Kutschilla," employed in the treatment of backache; Myrobalans from *Terminalia Chebula* Retz Combretaceæ), known as "Chaliletsch asfar," which is crushed, boiled, and drunk with tea and sugar for anaemia; the unripe fruit of *Myrobalani nigra* var. *indica*, known as "Chaliletsch Kara" and used as the preceding; the seeds of a *Sisymbrium*, probably *Sisymbrium Sophia*, natively called "Chabba" and purgative in action; the seeds of *Entada scandens*, which are eaten with sugar for backache and known to the natives as "Kurri Katar;" the galls and fruits of a *Pistacia* used for stomachache; Aleppo Galls, known as "Apas" and "Masi" and smoked with tobacco by the natives for headache and pain in the eyes; the blue flowers and verticillasters of an *Echium*, employed in heartburn and fever; Meeca Senna leaves, known as "Semeh Mekeh," which are boiled with milk as a purgative; an inferior variety of Tragacanth, called "Katira," which is crushed and soft-boiled as a probable remedy for headache; Gum Arabic, known as "Samgh i arabi," is dissolved in hot water as eye drops; an inferior grade of Hashish called "Nascha" is smoked or eaten as a narcotic; sticks of red bolus, which DRAGENDORFF mentions as "Tillae armani" and "Gul armani," are employed in the treatment of diseases of the oral cavity; a fine red crystalline powder called "Schingab" is applied externally in the treatment of child rash; a globular, brownish-red structure, about 4 cm. in diameter and consisting of a mixture of fennel, the fruits of an *Apium* species, and *Trachyspermum copticum* L., is powdered and taken with milk as a sedative; a coarse brownish powder mixed with numerous whitish particles and consisting of powdered *Veratrum* rhizome and powdered cloves, is employed as a snuff for headache.—H. W. Youngken.

2086. COATES, U. AYLMEYER. **Poke root in medicine.** Pharm. Jour. 105: 454. 1920.—A review of the therapeutic values and medicinal uses of the fruit and root of *Phytolacca decandra* from the literature of the last century.—E. N. Gathercoal.

2087. COUCH, JAMES F., AND LEIGH T. GILTNER. **An experimental study of Echinacea therapy.** Jour. Agric. Res. 20: 63-84. 1920.—Various preparations of *Echinacea*, the "specific medicine echinacea," the fluid extract, and "subcutoid inula and echinacea," were studied as remedies in several types of infections and allied diseases, both acute and chronic, in guinea pigs. The material was not effective in the case of botulism, tetanus, septicemia, rattlesnake venom, tuberculosis, and trypanosomiasis.—Definite evidence of organic effects from the echinacea itself was not obtained.—D. Reddick.

2088. CLARK, A. WAYNE, R. O. SMITH, AND LEROY FORMAN. **Purity standards for absorbent cotton.** Jour. Amer. Pharm. Assoc. 9: 958-965. 1920.—A report of the work on extraction methods for impurities in absorbent cotton. Authors find themselves unable to formulate a satisfactory method for testing for the degree of absorbency which will express the

results in a scientific way. As the U. S. Pharm. IX does not contain a water extraction test, authors suggest that one be included in the forthcoming revision. The weight of the residue obtained, as per method given, should not exceed 0.25 per cent. Authors see no value in or need for an alcohol extraction, as the water and ether extractions suffice. In a comparison of the Soxhlet, U. S. Pharm., and the Aliquot methods for ether extract, practically all ether-soluble material was obtained by the first method in six hours. The U. S. Pharm. method gave about 40 per cent and the Aliquot method about 50 per cent. Suggested standard requirements for absorbent cotton for the forthcoming revision of the U. S. Pharm. are given.—*Anton Hogstad, Jr.*

2089. EBERLE, E. G. **World trade, production and consumption of crude botanical drugs.** Jour. Amer. Pharm. Assoc. 9: 947. 1920.—An editorial discussion of a recent report of the U. S. Tariff Commission, in which the probable future of American drug cultivation and, in connection therewith, the world trade, production, and consumption of crude botanical drugs are considered. Author quotes various portions of the report referring to the American crude drug industry in which it is recommended that the American industry be aided and consideration given to the advisability of promoting and continuing cultivation of the indispensable drugs which have been successfully produced under American climate, labor, and economic conditions.—*Anton Hogstad, Jr.*

2090. ECKLER, CHARLES R. **A contribution to the pharmacology of cotton root bark.** Lilly Sci. Bull. 1: 349-368. 3 pl. 1920.—Animal tests were made on several commercial samples of green and dried cotton root bark, and on the bark of thirteen different varieties of cotton. These tests were made in comparison with ergot and pituitary extract. Several different animal tests were used, including the cock's comb method, blood pressure determinations, and the isolated and intact uterus methods. The conclusions reached were that the physiological activity of cotton root bark was not comparable to that possessed by ergot.—*Fred A. Miller.*

2091. GLOVER, GEO. H. **Plant poisoning.** Amer. Jour. Vet. Med. 15: 315-316, 338. 1920.—An address delivered before the Missouri Valley Veterinary Association covering in a general way the conditions under which the poisoning of livestock takes place.—*C. D. Marsh.*

2092. GREENISH, HENRY G. **Uzara: what is it?** Pharm. Jour. 105: 474-475. 1920.—A new remedy useful for dysentery and diarrhoea, originally obtained from native medicine-men of the Lake district of equatorial Africa. It is the root probably of a species of the Asclepiadaceae, a shrub with long thin twigs and long narrow leaves in pairs. The root is large and woody, somewhat aromatic and very bitter. It is exhausted with 10 per cent alcohol. A number of active principles have been isolated. To one is attributed a soothing action on the intestine; one or several others act on the circulation and on the nerve-system. Intravenous injections of small doses produce a rise in blood pressure similar to the action of adrenalin. The Biological-Agricultural Institute in Amani submitted herbarium material and root samples of a drug, used by the Kaffirs for colic, which was identified as *Dicoma anomala* of the Compositae. It is questionable whether this plant is the true source of uzara.—*E. N. Gathercoal.*

2093. HOLMES, E. M. **On the use of poke root in medicine.** Pharm. Jour. 105: 417. 1920.—That *Phytolacca decandra* possesses active properties there can be no doubt. Its physiological action and its chemical constituents seem worthy of careful investigation, especially the saponin, which may possess haemolytic activity. The drug appears to be especially valuable in resolving tumors of the breast. The fresh root, undried, is the most active, and is applied externally over the tumor and kept wet with the tincture until well-developed pustular sores are formed. Several cases of tumor and cancer of the breast as also of epithelioma are cited in which tumor resolution with complete cure has resulted.—*E. N. Gathercoal.*

2094. HOMMEL, PHILEMON E. **The lemon.** Practical Druggist 38¹¹: 20-21. 1920.—An account of the history, structure, constituents and medicinal uses of the lemon.—*Wm. B. Day.*

2095. JERMSTAD, ALEX. **Sur la détermination de la teneur de l'opium en morphine.** [On the determination of the strength of opium in morphine.] *Repertoire Pharm.* 32: 257-262. 1920.—All methods may be grouped under six headings, viz: (1) Alcohol; (2) water (Helfenberg's); (3) lime; (4) precipitation and reduction; (5) polarimeter; (6) other methods. Method 3 is employed by the French, English, Dutch, Japanese, Spanish, and American Pharmacopoeias. The author proposes a modification of HELFENBERG's method which has the following advantages: (1) Use of equal quantities of opium and reagents; (2) methyl-red is exact and active as an indicator; (3) no acetic ether; (4) no results rendered inexact by alkalinity of water; (5) possibility of combining the determination of morphine with that of the extract of opium.—*Heber W. Youngken.*

2096. KILMER, F. B., AND RALPH O. SMITH. **Belladonna cultivation in a practical way.** *Amer. Jour. Pharm.* 92: 620-630. 7 pl. 1920.—A brief summary of the results obtained in the cultivation of belladonna at the Johnson & Johnson belladonna farm, since 1900. Authors discuss climatic and soil conditions, methods of cultivation, harvesting, yield, and cultural experiments.—No successful cultivation, as far as the authors are aware, has been made on this continent by sowing seed in open ground. At least two crops of leaves can be harvested from first year plants; from second and third year plants two to four cuttings are usual. The yield of leaves and stems is greatest from second and third year plants. The yield per 1000 plants was as follows: Second year plants—herb 1177 pounds, alkaloid 0.891 pound; first year seedlings (potted plants)—herb 527 pounds, alkaloid 0.313 pound; first year seedlings (cold frame plants)—herb 534 pounds, alkaloid 0.289 pound.—Authors also submit data to the effect that the tops of belladonna, including stems, fully meet the requirements of the U. S. P.; they see no reason why belladonna herb, especially that obtained from cultivated plants, should not be admitted to the Pharmacopoeia under proper restrictions as to alkaloidal content, etc.—*Anton Hogstad, Jr.*

2097. KING, E. D., JR. **Poisonous plants of the south.** *Jour. Amer. Vet. Med. Assoc.* 57: 302-313. 1920.—This is a list of plants with brief remarks regarding properties, and treatment of poisoned animals.—*C. D. Marsh.*

2098. MICHELETTI. **Piedmontese peppermint oil.** [From *La Parfumerie Moderne* Oct. 1920.] *Chem. & Druggist* 93: 1507. 1920.—Peppermint oil distilled from Mitcham peppermint, cultivated about Vigone and Pancalieri and in the province of Turin, is of exceptional quality on account of the delicacy of its perfume and sweetness of its aroma. Over 25,000 kilos are produced annually.—*E. N. Gathercoal.*

2099. PAMMEL, L. H. **Alsike clover poisoning.** *Amer. Jour. Vet. Med.* 15: 437-438. 1920.—A description of some cases of poisoned horses with an account of the symptoms exhibited.—*C. D. Marsh.*

2100. PAMMEL, L. H. **Castor seeds poisonous.** *Amer. Jour. Vet. Med.* 15: 171-172. 1920.—The author quotes E. WHITE, apparently from a letter, who gives a detailed account of the poisoning of horses by castor beans, with a description of the symptoms, post-mortem findings, and treatment.—*C. D. Marsh.*

2101. PAMMEL, L. H. **European morning-glory suspected of being poisonous.** *Amer. Jour. Vet. Med.* 15: 439. 1920.—This is an account of a sick horse which possibly had been poisoned by *Convolvulus arvensis*.—*C. D. Marsh.*

2102. PAMMEL, L. H. **Is the dogwood poisonous?** *Amer. Jour. Vet. Med.* 15: 66. 1920.—The author in reply to a query about the poisonous properties of *Cornus asperifolia* expresses his opinion that it is not toxic.—*C. D. Marsh.*

2103. PAMMEL, L. H. **Ground cherry leaves supposed to be poisonous.** *Amer. Jour. Vet. Med.* 14: 606. 1919.—In reply to a query about *Physalis longifolia* it is stated that the green fruit and leaves are poisonous.—*C. D. Marsh.*

2104. PAMMEL, L. H. **Hogs poisoned by young cocklebur.** Amer. Jour. Vet. Med. **15**: 385-386. 1920.—This is an account of the deaths of some hogs, presumably from eating cocklebur, with remarks on cocklebur poisoning.—*C. D. Marsh.*

2105. PAMMEL, L. H. **Poisoning from silage and moulds.** Amer. Jour. Vet. Med. **14**: 605-606. 1919.—Attention is called to the fact that certain fungi are pathogenic and others produce toxic substances so that there is always danger in feeding moldy forage.—*C. D. Marsh.*

2106. PAMMEL, L. H. **Suspicious poisonous weeds.** Amer. Jour. Vet. Med. **15**: 384-385. 1920.—A brief account is given of *Lactuca canadensis*, *Oxybaphus nyctagineus*, and *Lactuca scariola*.—*C. D. Marsh.*

2107. SHEPPARD, PHILIP A. E. **African aboriginal therapy.** Amer. Jour. Public Health **10**: 227-235. 1920.

2108. WALLIS, T. E. **Analytical microscopy, IX.** Pharm. Jour. **105**: 376-378. *Fig. 20-21.* 1920.—Microsublimation of active principles of plants and microchemical precipitations in plant cells are discussed.—*E. N. Gathercoal.*

2109. VAN DER WIELEN, P. **On the cultivation of *Chenopodium ambrosioides anthelminticum*.** [From Onze Tuinen Aug. 17, 1920.] Chem. & Druggist **93**: 1334. 1920.—The discovery in 1912 that the oil distilled from the seed of this plant was a most effective remedy in ankylostomiasis (hookworm disease), has resulted in a world-wide demand. The principal source has been from cultivation near Baltimore. Recently its cultivation in Delhi and elsewhere in the Dutch East Indies and in Holland has proven very successful. The oil produced appears to be fully equal to American oil.—*E. N. Gathercoal.*

2110. WILMOT, F. C., AND G. W. ROBERTSON. **Senecio disease.** [Taken from South African Med. Rec.] Jour. Amer. Med. Assoc. **75**: 1524. 1920.—In 1918 sickness of obscure causation, accompanied by abdominal pain and vomiting, occurred in the George district of Cape Province, South Africa. The disease was shown to be due to meal and bread containing the seeds and portions of the plants of *Senecio ilicifolius* and *Senecio burchelli*, weeds in the wheat fields of that vicinity.—*Wm. B. Day.*

2111. YOUNGKEN, H. W., AND G. A. SLOTHOWER. ***Rhus venenata* DC.** Amer. Jour. Pharm. **92**: 695-701. *Fig. 1-4.* 1920.—A histological study of the stems and leaves of *Rhus venenata* with some observations on the poisonous constituent. The resin canals of the stem which extend from the bast region and penetrate the medullary region, where they end blindly, are narrow-branching vessels, filled with a dark, reddish-brown substance of a resinous nature. This resinous substance did not respond to the gummy lignin tests (Youngken) as applied to the stems of the Myricaceae. It did however, upon treatment with alcoholic potash, form a nigrescent compound, a reaction characteristic of the poisonous substance causing the dermatitis produced by the poisonous species of *Rhus*.—In the study of the leaf non-glandular, unicellular, and uniseriate hairs were noted in the dorsal region, many of which contained the resinous substance responding to the nigrescent reaction. Resin canals were noted in the vascular bundles but not in the mesophyll. To account for the presence of the resin in the hairs the authors are inclined to believe that it may be a direct product of the protoplasm. A series of successive extractions was made with petroleum ether, alcohol and water respectively. The poisonous principle was extracted with the petroleum ether. This extract applied to the inner forearm produced in 24 hours inflammation with violent itching and in 36 hours vesication.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*C. W. DODGE, *Assistant Editor*

GENERAL

2112. MASSART, JEAN. *Éléments de biologie générale et de botanique*. [Elements of general biology and botany.] Vol. 1, Part I. 208 p., 188 fig. Maurice Lamertin: Bruxelles, 1920.—The complete work will consist of 2 volumes aggregating 640 pages, with 500 figures. Volume I, Part I, contains General Biology and Part II, Protista. Volume II will consist of Part III, Metaphyta. (Protista include protozoans and protophytes.)—General Biology, here abstracted, is divided into three chapters: (I) Life and death, (II) the cell, (III) the factors in evolution. In Chapter I are presented the ten headings considered below: (1) *The forces active in organisms*. Herein is revealed one of the author's characteristic viewpoints. The opening sentence reads, "It has taken long centuries to rid biology of the prejudice that the activity of living things is different from that of inorganic nature." BICHAT's definition, "Life is the ensemble of conditions which resists death," is given as representative of the viewpoint of naturalists up to about 1800, organisms being considered as showing a vital force not only distinct from, but directly opposed to, such forces as heat, gravitation, and light. Artificial synthesis of complex animal and vegetable substances, energy transformations in living things, and other considerations lead the author to state: "No vital force exists that does not resolve itself wholly into chemical and physical forces. . . . Because most vital processes are too complex to be interpreted by us at present, is it a reason for hiding our ignorance behind the fallacious doctrine of a vital force?" Brief mention is made of the relative importance of heat, molecular forces, gravitation, light, chemical energy, electricity, magnetism, X-rays, and radioactivity. (2) *Biogenic elements*. The unique properties of the element carbon, which so admirably qualify it to be the essential constituent of all "living molecules," are discussed. (3) *The origin of life*. (4) *Conditions favorable to life*. Here are discussed: integrity of structure, temperature, osmotic pressure, manometric pressure, oxidizable substances and oxygen, environment unfavorable to life. (5) *Specificity of requirements*. (6) *Accommodation to temperature, water, osmotic pressure, nutrition, oxygen; influence on distribution*. (7) *Retarded activity and latent life*. (8) *Death*. (9) *The germinal line*. (10) *The loss of mortality*. (11) *The duration of life*.—Chapter II presents a consideration of the cell in four sections: (1) *Cell structure*, cell secretions, intercellular communications, cell evolution, relations between cell organs. (2) *Arrangement of cells*. (3) *Functions of the cell*. The last topic is discussed under three headings: (a) Molecular phenomena, intracellular pressure, turgescence and plasmolysis, osmotic pressure and growth, relation of ameboid movements to intercellular circulation and surface tension, hygroscopic movements. (b) Metabolism of the cell, cellular enzymes, production of energy, elimination of waste products. (c) Irritability. Protoplasm is considered as composed of more or less liquid colloids held in a reticulum of more or less solid colloids. Stimuli are treated in four sections: (a) The stimulus, sense organs, anaesthesia, nature of stimuli (internal or external); (b) conduction of stimulus; (c) the reaction (tonus, interferences, response); (d) duration and intensity of reflex periods. (4) *Genesis of cells*, including determination of sex.—In Chapter III, the discussion is carried out under four headings: (1) *Heredity*. (2) *Variability, fluctuation and mutation*. (3) *Selection*. (4) *Method in phylogeny*.—Throughout the discussions the mechanical, physical, and chemical aspects of vital phenomena are emphasized, and an abundance of illustrative material is drawn from unicellular forms and from higher plants and animals, the latter being frequently contrasted and compared. Experiments are described to illustrate important phenomena.—*Lee M. Hutchins*.

PROTOPLASM, MOTILITY

2113. BOLTE, ELISABETH. *Über die Wirkung von Licht und Kohlensäure auf die Beweglichkeit grüner und farbloser Schwärmzellen*. [The effect of light and carbonic acid on the motility of green and colorless swarm cells.] *Jahrb. Wiss. Bot.* 59: 288-324. 1919.—An inves-

tigation of the tonic stimulation of various motile cells by light and carbon dioxide. The following were found to be negatively photokinetic in the sense in which Engelmann employed the term, that is, underwent light rigor when illuminated but continued for a relatively long period in darkness: 2 species of *Phacus*, 2 species of *Chlamydomonas*, and the zoospores of *Ulothrix subtilissima*. *Chlamydomonas variabilis*, *Carteria ovata*, *Euglena gracilis*, species of *Trachelomonas*, *Volvox aureus*, *Pandorina Morum*, *Eudorina elegans*, *Gonium pectorale*, and *Lepocinclis texta* were found to be positively photokinetic organisms, a category to which heretofore only the purple bacteria were known to belong. Light was found to be without influence upon the motility of *Euglena hyalina*, *Chilomonas curvata*, *Menoidium incurvum*, *Polytoma uvella*, *Polytomella agilis*, and *Euglena proxima*. Some observations indicate that dark rigor is closely related to the cessation of photosynthesis, but in certain cases, as in that of *Chlamydomonas variabilis*, there seems to be no relation. No instance of change from positive to negative kinesis after long and intense illumination, such as was reported by Engelmann for the purple bacteria, was observed by the author. Of 19 photokinetic organisms 17 were found to be phototactic, and of 18 phototactic organisms 17 were photokinetic. In *Volvox aureus*, *Euglena gracilis*, *Trachelomonas*, *Eudorina elegans*, *Chlamydomonas*, *Pandorina Morum*, *Euglena hyalina*, *Euglena acus*, and *Menoidium incurvum* motility was lost in a carbonic acid-free medium. In some cases this was the result of the absence of free H-ions but in others it was apparently a specific effect of the absence of carbonic acid.—*R. M. Holman*.

2114. METZNER, P. Die Bewegung und Reizbarkeit der bipolar gezeisselten Spirillen. [The movement and stimulus response of spirilla with bipolar flagella.] Jahrb. Wiss. Bot. 59: 325-412. 1919.—By observation of the active organisms in the dark field by rhythmic intermittent illumination the author has investigated the mechanics of the movement of *Spirillum volutans* and *Spirillum undula* under normal conditions and when subjected to chemical and thermal stimulation. These organisms have a single tuft of flagella at each end, consisting of as many as 25 separate flagella united into one rather coarse cord which functions like a single flagellum. This is spiral in form and when active describes rotation figures of various forms, the anterior one a bell opening backward and the posterior one a cup-shaped figure also opening towards the rear. The rotation of this composite flagellum results presumably from the contraction, one after another, of the component flagella. The organism is propelled through the water in a straight path as the result of the rotation imparted to the body of the *Spirillum* by the activity of the flagella. The rates of the rotation of the two flagella are about the same. In *S. volutans* it is about forty per second and the rotation rate of the body about thirteen per second. The most common reaction to any stimulus is a backward movement resulting from simultaneous reversal of the direction of rotation of the flagella. The center for the perception of stimulus is apparently at the base of the flagella. Transfer of stimulus from one end to the other of the organism is so rapid that normally reaction by both flagella is practically simultaneous. In case of very weak stimulation or lowered irritability a distinct interval may intervene between the reactions, or reaction may be restricted to the end directly stimulated. Moderate temperature increase merely accelerates flagella movement, but further warming checks it, presumably because of exhaustion of raw materials resulting from great increase of normal processes of metabolism. When photodynamically active pigments are present in the surrounding medium flagella activity is checked by light but it may be resumed if the photodynamic action is interrupted in time. Depression of temperature causes reversal of the movement of the flagella and continuous diffuse cooling results in rhythmically repeated reactions, as does also a weak homogeneous solution of cocaine or chloroform or any continuous stimulation.—*R. M. Holman*.

DIFFUSION, PERMEABILITY

2115. GUÉRIN, P., ET CH. LORMAND. Action plasmolytante d'un certain nombre de vapeurs. [Plasmolytic action of certain gases.] Compt. Rend. Acad. Sci. Paris 170: 1598-1601. 1920.—Methyl alcohol is found to act more quickly than ethyl alcohol, and benzylic

alcohol acts more slowly. Phenols cause the liberation of hydrocyanic acid. Aldehydes also cause the liberation of hydrocyanic acid, but without plasmolysis in proportions of 10–20 drops to a liter. Trioxymethylene 0.2 gm. per liter, and 10 drops of 25 per cent formaldehyde, cause the liberation of HCN. Acroleine, 1 drop per liter, causes plasmolysis, and with 50 drops per liter it stops fermentation. Quinone, pyridine, HCl, and H₂SO₄ cause plasmolysis.—C. H. Farr.

2116. LEWIS, FRANCIS J., AND GWYNETH M. TUTTLE. Osmotic properties of some plant cells at low temperature. *Ann. Bot.* 34: 405–416. *Fig. 1–5.* 1920.—The authors carried out serial determinations of osmotic pressure, electrical conductivity, and amounts of sucrose, maltose, and glucose in leaf tissues of both woody and herbaceous evergreens. They hesitate to record any correlation between these values and the temperature records on the results of the work on one season only, but they note the occurrence of maximum osmotic concentration either in December or in March. They found that the osmotic pressure was due chiefly to nonelectrolytes, the concentration of electrolytes changing but little throughout the season. Sugars disappear progressively from winter to summer, glucose being the last to be removed. An important fact in relation to resistance to frost-injury is revealed by supercooling experiments. Whereas the sap extracted from leaves of *Pyrola* froze at about $-3^{\circ}\text{C}.$, the leaves themselves could be cooled to $-32^{\circ}\text{C}.$ before freezing. A significant observation is also recorded regarding the chloroplast, which was seen to become disorganized during the winter months, the chlorophyll distributing itself around the nucleus, coalescing to form plastids again in April.—F. J. Lewis.

2117. SHULL, CHARLES A., AND S. P. SHULL. Absorption of moisture by gelatin in a saturated atmosphere. *Amer. Jour. Bot.* 7: 318–326. *1 fig.* 1920.—The authors summarize briefly the work of VON SCHRÖDER on the absorption of water by gelatin from liquid water and from a saturated atmosphere. On repeating a part of his experiments they obtained very different results, finding that gelatin absorbed much more water from a saturated atmosphere than von Schröder reported. Instead of reaching an equilibrium at a gain of 40 per cent in about a week, this absorption continued steadily until the end of the experiment (47 days), when water equal to over 170 per cent of the gelatin had been absorbed.—Equations for the curves of moisture intake are given. The authors call attention to the difficulty of maintaining a saturated atmosphere, and suggest that the difference between their results and von Schröder's is due to their greater success in this respect.—E. W. Sinnott.

WATER RELATIONS

2118. BIRCH-HIRSCHFELD, LUISE. Untersuchungen über die Ausbreitungsgeschwindigkeit gelöster Stoffe in der Pflanze. [Rate of transfer of dissolved substances in the plant.] *Jahrb. Wiss. Bot.* 59: 171–262. 1919.—The author has investigated in various plants the rate of conduction of solutions of lithium nitrate, ammonium carbonate, alcohol, methylene blue, eosin, and other substances in the parenchyma of the cortex and in the phloem. The downward movement of certain of these solutions in the water-conducting channels, simultaneous with the upward movement of the transpiration stream, was also studied. The experiments were undertaken with the object of throwing new light upon the natural transfer of materials in the plant. Conduction in the phloem was found to be at approximately the same rate as in the parenchyma, and not in excess of the rate of transfer by simple diffusion. Transpiration proved to be without influence upon the rate of transfer, in the phloem, of the substances employed. Potometer measurements of the water conducted by stems from which a length of the central cylinder had been removed showed the tissues outside the cambium to be able to conduct only from $\frac{1}{1000}$ to $\frac{1}{10000}$ of the water required by a normally transpiring branch. Lithium nitrate in solution was found to pass, though very slowly, through the thickened and cutinized endodermis of *Convallaria majalis*. The cuticle of the leaves of a number of plants was found to be relatively highly permeable to lithium nitrate solution, as was shown by the detection of the salt in the leaf and stem at some distance from a point on the intact upper side of a leaf where a drop of the solution had been placed. When

such a solution was supplied through the cut end of a side branch of a leafy shoot, downward conduction of the salt in the main axis took place even below the leafy region of the latter. The same result was observed even when there was an abundant supply of water from below, and in the absence of any pull by transpiring leaves. It was shown that the water channels under normal conditions function independently of each other. This was particularly clear when an eosin solution entered by a side branch. In such cases the staining in the woody cylinder below the point of attachment of the branch was sharply limited to the side on which the branch was attached. The downward movement observed was at a much lower rate than that of the normal transpiration stream but reached 1 to 10 cm. an hour when a 1 per cent lithium nitrate solution was used. The time required to transport a unit quantity of the salt a given distance was from $\frac{1}{25}$ to $\frac{1}{240}$ of that required by living tissue. However, the author doubts whether the ability of the wood to conduct dissolved substances downward at certain times is sufficient to provide for the necessary downward transport of material in the living plant.—*R. M. Holman.*

2119. PFEIFFER, T., UND A. RIPPEL. Über den Einfluss von Durstperioden auf das Wachstum der Pflanzen. [Regarding the effects of periods of drouth upon the growth of plants.] Landw. Versuchssta. 96: 353-363. 1920.—Lupines, asparagus, barley, and oats were grown under 2 sets of conditions as regards moisture content of the soil. In one case the moisture content of the soil was maintained at 60 per cent of the water-holding capacity of the soil, and in the other the plants were regularly allowed to go without watering until the moisture content of the soil had fallen to about 30 per cent of its water-holding capacity, after which it was again brought up to 60 per cent. This alternate lowering and raising of the moisture supply was repeated up to harvest time. It was found that under the alternating periods of drouth, crop production was decreased as follows: Lupines 20.5 per cent, asparagus 15.5 per cent, barley 6.2 per cent, and oats 3 per cent as compared with the plants grown under a constant, full supply of soil moisture. It is evident that different kinds of plants vary in their ability to adapt themselves to varying moisture supply.—*A. T. Wiancko.*

MINERAL NUTRIENTS

2120. DE ANGELIS D'OSSAT, G. Ancora sul calcare e le viti americane. [American grapes and lime.] Staz. Sper. Agrarie Ital. 53: 97-100. Pl. 2. 1920.—This is a short contribution upon the subject of adaptation of *Vitis Berlandieri*, *V. candida*, *V. rupestris*, *V. riparia*, *V. labrusca*, and *V. vinifera* to various concentrations of calcium carbonate in the soil. The conclusion is reached that the above mentioned species can develop normally and with no symptom of chlorosis in soils the concentration of which in CaCO_3 is much greater than is generally considered safe in practise. The calcimetric scale of BONNET is found to be of very little value.—*A. Bonazzi.*

2121. GEILMAN. Über die Verbreitung des Titans in Böden und Pflanzen. [The distribution of titanium in soils and plants.] Jour. Landw. 68: 107-124. 1920.—A method of determining the titanium content of soils is given, and its value tested. Analyses of a number of soil samples showed that titanium is very widely distributed in soils, the content varying from a trace to 1 per cent, with most of them showing from 0.3 to 0.6 per cent. Analyses of plants showed titanium always present, the content being greatest in the green parts, and the range being from a trace to 0.27 per cent.—*C. E. Leightly.*

2122. GILE, P. L., AND J. O. CARRERO. Cause of lime-induced chlorosis and availability of iron in the soil. Jour. Agric. Res. 20: 33-61. Pl. 5-6. 1920.—A brief review of ecological studies of calciphilous and calcifugous plants, and of vegetative experiments in which chlorosis has been produced by natural or artificial calcareous soils.—Experimental data are presented from which it is concluded that “‘lime-induced’ chlorosis seems to be due simply to a depression in the availability of iron in calcareous soils.” Treatment of chlorotic rice with a spray of ferrous sulphate shows that a lack of iron in the plant is at least one cause of the chlorotic appearance. There is no evidence of a general “lime effect” inducing chlorosis.—

Several pure, organic compounds of iron were used in pot experiments with soil but proved to be poor sources of iron for small rice plants. Bulky organic compounds such as stable manure, velvet bean plants, and tobacco stems when used in considerable quantity gave increased yields over non-fertilized pots, and it is thought that more iron becomes available from such sources.—The availability of iron is slightly greater when the soil moisture is at optimum content for growth than when the soil is too wet, but certain calcareous soils which commonly induce chlorosis in rice fail to do so when the soil is flooded.—*D. Reddick.*

2123. JOHNSTON, EARL S. Nutrient requirements of the potato plant grown in sand cultures treated with "type I" solutions. *Soil Sci.* 10: 389-409. 1 pl., 5 fig. 1920.—Potato sprouts separated from the seed pieces were grown in sand cultures treated with 21 different proportions of monobasic potassium phosphate, calcium nitrate, and magnesium sulphate. The partial osmotic pressure varied by equal increments of $\frac{1}{3}$ the total osmotic pressure of 1 atm. Cultures giving the highest yields were low in magnesium sulphate, high in calcium nitrate, and medium in potassium phosphate. The lowest were low in calcium nitrate. The average water requirement was 403. No relation between high yield and low water requirement nor low yield and high water requirement was noted.—*W. J. Robbins.*

2124. PFEIFFER, T., UND A. RIPPEL. Der Einfluss von Kalk und Magnesia auf das Wachstum der Pflanzen. [The influence of lime and magnesia on the growth of plants.] *Jour. Landw.* 68: 5-39. 1920.—Experiments were made on oats in pots with clean, washed glass-sand as substratum. Similar yields were produced when the molecular relationship of CaO:MgO fluctuated between the limits 9:1 and 1:1 in 4 different series where increasing doses of CaO and MgO were employed. The amounts of CaO and MgO taken up by the plants as found by analyses led to the same conclusions as those from plant yields. The yield decreased when CaO:MgO relationship increased from 1:1 to 1:9, interpreted as due to lack of lime necessary to plant growth and not direct injury from MgO. Where the limit lies at which the undoubtedly existing antagonistic action between MgO and CaO begins to have a tangible, practical significance was not established. Some indications (not confirmed) of the possibility of substituting for CaO and MgO were noted. The CaO and MgO content of oat plants varies within wide limits and is in part unusually high. The general rule that in the seed MgO should be more important, and in the straw CaO, agrees with these experiments only infrequently, and by no means universally. In opposition to other observations, an increasing MgO content has not resulted in increased P_2O_5 accumulation. A certain relationship between CaO:MgO: P_2O_5 in the sense used by LOEW was not confirmed. The content of the oat plant in K_2O and especially in Na_2O , so far as determined, has a stationary value and does not decrease under the influence of added amounts of CaO and MgO. The lime-potassium law is not confirmed by the foregoing experiments.—*C. E. Leighty.*

2125. PFEIFFER, T., UND W. SIMMERMACHER. Die Kalkfeindlichkeit der Lupine. [The aversion of the lupine to lime.] *Landw. Versuchssta.* 93: 1-47. 1919.—According to earlier investigations, discussed in articles published in *Mitt. Landw. Inst. Bresslau* 6: 1911, and 7: 1914, it seemed that while the ill effects of lime upon the lupine were evidently due to the plant's general sensitiveness to alkaline substances, there were indications that lime in itself might be harmful regardless of its combination. It was concluded, however, that other factors might enter into the injury to lupines, such as reduction of phosphorus assimilation, variations in assimilation of iron, and effect upon nodule-forming bacteria. To test these points as well as to further study the effects of different lime compounds, the authors conducted pot experiments. The results indicate that lime as calcium carbonate is beneficial rather than harmful. The evidence regarding the effect upon nodule formation and phosphorus and iron assimilation is inconclusive. It is concluded that further investigations along this line will be necessary.—*A. T. Wiancko.*

2126. RIPPEL, AUGUST. Beitrag zur Kenntnis des Verhaltens der Aschebestandteile und des Stickstoffs im herbstlich vergilbenden Laubblatt. [Contribution to a knowledge of the behavior of the ash substances and nitrogen in autumn leaves.] *Jahresber. Ver. Angew. Bot.*

16: 122-132. 1918.—On the basis of his experiments Rippel does not believe in the theory of the conservation to the plant of the potassium, phosphorus, and nitrogen compounds, held by some investigators as the explanation of the recession of these compounds during the yellowing of the leaves in the fall. He thinks the reason for the early recession (even before yellowing) of potassium from the leaf to the plant is to fulfill some at present unknown function and that the later recession of phosphorus and nitrogen is due to the fact that during yellowing of the leaf the transfer of substances from the leaf to the plant far outbalances the flow into the leaf of such substances.—*Orton L. Clark.*

PHOTOSYNTHESIS

2127. ANONYMOUS. Gas as a fertilizer. *Sci. Amer. Monthly* 1: 562. 1920.—This is a brief description of German experiments on the effect of increased amounts of carbon dioxide on the growth and development of plants.—*Chas. H. Otis.*

2128. McLEAN, F. T. Field studies of the carbon dioxide absorption of coco-nut leaves. *Ann. Bot.* 34: 367-389. 1920.—There is described a method of measuring the carbon dioxide absorption of field crops in situ under conditions as little modified as possible. The method is found to be satisfactory in studying the comparative rates of absorption of leaves from the same plant or different kinds of plants, and also the same leaves at different times of the day. Data obtained by this method show that the middle-aged leaves of coconut absorb carbon dioxide more rapidly than young or mature leaves. The maximum rate of absorption is in the morning, followed by a depression at mid-day, a second rise in the afternoon, and a final decline towards sunset. Detached pinnae of a coconut leaf exhibit the maximum absorption at a different time of day from that of the attached ones, but the rates of absorption are similar in both cases. *Abaca* leaves are found to have an absorption rate similar to coconut while those of sugar cane absorb carbon dioxide much more rapidly.—*Joanne L. Karrer.*

2129. RAVENNA, C. Sulla formazione dell'amido nelle piante verdi. [The formation of starch in green plants.] *Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.)* V, 29¹: 148-150. 1920.—The author replies to an article by POLACCI (*Atti Istit. Bot. Univ. Pavia* II, 27: 29. 1917) criticising the author's previous article (*Rendiconti* V, 25¹: 649. 1916).—*F. M. Blodgett.*

2130. WRIGHT, R. C. An apparatus for determining small amounts of carbon dioxide. *Amer. Jour. Bot.* 7: 368-370. 1 fig. 1920.—The author has developed a light, compact, and sensitive apparatus for measuring the amount of carbon dioxide in the air, for special use in storage plants. Its structure and manipulation are described.—*E. W. Sinnott.*

2131. WURMSER, RENÉ. Action sur la chlorophylle des radiations de différentes longueurs d'onde. [The effect on chlorophyll of rays of different wave lengths.] *Compt. Rend. Acad. Sci. Paris* 170: 1610-1612. 1920.—Photochemical susceptibility is found to be related to wave length in approximately the proportion of the absorption constants, except in the case of minimum absorption where it decreases very rapidly. The radiation of the two principal bands of red and violet are equally active for equal energy values.—*C. H. Farr.*

METABOLISM (GENERAL)

2132. BOURQUELOT, ET BRIDEL. Obtention biochimique du sucre de cane à partir du gentianose. [Sucrose from gentianose by biochemical methods.] *Compt. Rend. Acad. Sci. Paris* 171: 11-15. 1920.

2133. CIAMICIAN, G., E C. RAVENNA. Sul contegno di alcune sostanze organiche nei vegetali. Nota XII. [Upon the behavior of some organic substances in plants.] *Gazz. Chim. Ital.* 50: 13-46. Fig. 1-17. 1920.—This is a continuation of the work published by the authors upon the action of organic substances on the growth of young seedlings of *Phaseolus*. In the present contribution the plants studied were: *Phaseolus*, *Cucurbita*, *Vicia*, and *Lycopersicon*.

persicum. The compounds studied were methylamine, ethylamine, propylamine, butylamine, amylamine, isoamylamine, formamide, acetamide, butyric acid, isobutyric, oxalic, and succinic acids; potassium, methyl, and ethyl tartrates; salts of trimethylammonium; betaine, pyridine, picoline, quinoline, isoquinoline, quinaldine, cocaine, eegonine, nor-eegonine; and the methylic ether of nor-eegonine. Caffeine, theobromine, nicotine, codeine, and morphine were also studied. A large variation in behavior towards the growing plants was observed, some being extremely toxic, others only producing etiolation and others being without action. Some of the compounds used have a stimulating effect upon the formation of chlorophyll with a resultant deeper shade of green in the leaves, and a greater production of starch. Trimethylamine, pyridine, piperidine, caffeine, theobromine, and pyrocatechine were found in the pulp of the bean plants after they had grown in solutions containing these substances.—The second part of the paper is given to the study of the transformation of the compounds in the pulp of *Spinacia*. Asparagine was found to be transformed into acetic aldehyde, acetic and succinic acids; lactic acid was synthesized into a compound which yielded it again on treatment with emulsin; salicylic acid behaved similarly to lactic acid, but it also gave rise to a small quantity of volatile acids.—A. Bonazzi.

2134. CIAMICIAN, G., E C. RAVENNA. Sull'influenza di alcune sostanze organiche sullo sviluppo delle piante. Nota IV. [On the influence of some organic substances on the development of plants.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) V, 29¹: 7-13. 1920.—This is a continuation of experiments previously reported (Rendiconti V, 26¹: 4; 27¹: 38; 29¹: 13) in which kidney-bean plants in cotton in germinators were watered with solutions one to a thousand of substances being tested. Tested in this way methylamine, ethylamine, propylamine, butylamine, and amylamine showed a diminishing toxicity (except in the case of the substance first mentioned), which paralleled the increasing length of the chain of carbon atoms. Isoamylamine was more harmful than normal amylamine and produced an albinism similar to that produced by nicotine. Similarly the isobutyrate of potassium was more harmful than the normal butyrate. Foramide was deleterious while acetamide was not. Oxalic acid caused a poorer growth than succinic acid. Methyl and ethyl tartrate produced spots on the primordial foliage while potassium tartrate was harmless. Quinoline, isoquinoline, and quinaldine were all poisonous, the last most so. While cocaine proved strongly toxic, eegonine and the methyl ether of nor-eegonine only caused a few spots on the first leaves and nor-eegonine was without effect. A few experiments were made with other plants which were in general only affected by the more toxic substances and showed considerable differences in behavior. That theobromine and caffeine stimulate a production of starch was confirmed. Spectroscopic examination of alcoholic extracts of certain experimental plants, dark in color, showed only quantitative differences.—F. M. Blodgett.

2135. GHIRLANDA, CARLO. Sulle sostanze tanniche del "Morus alba." [Tannic substances in *Morus alba*.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) V, 29¹: 146-148. 1920.—Analyses were made after the methods of Löwenthal and Schröder of various parts of the mulberry tree. Except in the wood of the branches, considerable quantities of tannins were found in the different parts, the amount increasing in the following order: wood of the roots, cortex of the branches; cortex of the roots; foliage. The foliage contained more tannic substances in the morning than in the evening.—F. M. Blodgett.

2136. HEFS, K., UND W. WELTZIEN. Über die Fähigkeit der Pflanze optische Antipoden aufzubauen. [The possibility of plants building up optical antipodes.] Ber. Deutsch. Chem. Ges. 53: 119-129. 1920.—Experiments attempting to cause racemization of *d. coniine* and *d. methyl coniine* gave negative results.—Henry Schmitz.

2137. JONES, WALTER. The chemical constitution of adenine nucleotide and of yeast nucleic acid. Amer. Jour. Physiol. 52: 193-202. 1920.

2138. KAPPEN, H., UND M. ZAPFE. Die Azidität der Pflanzensäfte unter dem Einfluss einer Kalkdüngung. [The acidity of plant juices under the influence of liming.] Landw.

Versuchssta. 93: 135-146. 1919.—Beans and lupines were grown on a loamy sand soil without lime and with 1, 5, and 10 per cent additions of ground limestone. Harmful effects in proportion to the amount of liming were shown during the earlier stages of growth by yellowing of the leaves and even dying of the lower leaves in the worst cases, but these apparently harmful effects disappeared as the plants grew older. The hydrogen-ion concentrations of the juices of the roots and tops were determined at the time of blossoming and were found to be the same regardless of the amount of liming. The conclusion is that though plants grown on limed soil probably take up more lime, they are able to maintain the same acidity relations in their juices as on unlimed soil. It is pointed out that these determinations were made only at the time of blossoming and that there might be differences in the acidity of the plant juices at other stages of development.—A. T. Wiancko.

2139. LUIGI, BERNARDINI. *La nicotina nel tabacco (contributo allo studio della genesi e della funzione degli alcaloidi.)* [Nicotine in tobacco (contribution to the study of the genesis and function of the alkaloids).] *Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.)* V, 29¹: 62-66. 1920.—The amount of nicotine in different parts of tobacco plants at different ages was determined. Analysis of very young plants with minute first leaves showed nicotine when grown in light but not when grown in darkness. Plants severely pruned did not utilize the nicotine as reserve nitrogen, and germinating tobacco seeds were retarded in germination by very dilute solutions.—F. M. Blodgett.

2140. PONSELLE, A. *Détermination de la réaction des milieux de culture par la mesure de la concentration en ions hydrogène.* [Determination of the hydrogen-ion concentration of culture media.] *Bull. Inst. Pasteur* 18: 601-610. 1920.—This is a short review of the theory of acidity and of the principles underlying the methods for the determination of hydrogen-ion concentrations. A few examples of simple calculations to be used in determining P_H values and a short exposition of the technique of the colorimetric methods are given. The work of SÖRENSEN, HORWITZ, MEYER and OSTENBERG, CLARK and LUBS, HOMER, PONSELLE, BARNETT and CHAPMAN, and of FENNEL and FISHER is reviewed. The reader is cautioned against the use of the colorimetric method in adjusting the reaction of deeply colored media, and reference is made in this connection to the electrometric methods. The contribution is in fact a guide to be used in daily bacteriological operations and not a theoretical discussion of the subject.—A. Bonazzi.

2141. RAVENNA, C., E G. BOSINELLI. *Sul dipeptide dell'acido aspartico e sulla funzione dell'asparagina nelle piante.* [Upon the aspartic acid dipeptide and the function of asparagine in the plant.] *Gazz. Chim. Ital.* 50: 281-288. 1920.—This is a continuation of the investigations published in 1919. The authors find that after long boiling, solutions of asparagine gave the biuret reaction, and were precipitated by lead acetate. The precipitate filtered and dealed with H_2S gave a white amorphous powder of the following elementary composition: C, 38.78; H, 4.85; N, 11.60. Aspartic acid on the other hand yielded only ammonium aspartate. The authors conclude that the acid amides and not the simple amino acids are directly concerned in the building of polypeptides and the subsequent protein synthesis in plants. As PIUTTI claims asparagine to be a β -asparagine the polypeptide obtained must be formed by the linking of the amidic group on one side with the carboxylic on the other and should be isomeric with the β -polypeptide obtained by FISCHER and KOENIGS from 2-5 diketopiperazine-3-6 diacetic acid.—A. Bonazzi.

METABOLISM (NITROGEN RELATIONS)

2142. CAUDA, A. *Metodo pratico per svelare negli schizomiceti l'attitudine a fissare l'azoto libero.* (Nota preliminare.) [A practical method for the detection of nitrogen fixing properties in bacteria. A preliminary note.] *Staz. Sper. Agrarie Ital.* 53: 79-80. 1920.—The growth of unicellular algae, such as *Chlorella vulgaris*, *Protococcus*, and *Chlorococcus*, upon calcium carbonate-malto-gelatine is distinctly variable and directly correlated with nitrogen content of the medium. On agar to which no nitrogen has been added these algae develop

no chlorophyll even when exposed to light, and will continue to grow thus on successive transfers. When nitrogen is added to these chlorophyllless growths the pigment is developed and the algae become normal although kept in darkness. This property has been used by the author in the attempt to determine whether bacteria introduced into the cultures of "white" algae are capable of fixing free nitrogen. Positive results were obtained with mixed cultures of a colorless alga and *Azotobacter chroococcum*. In the dark, when on acid maltogelatin, the alga in pure culture forms pigment, while on a neutral medium in the dark no pigment formation takes place, although transfer to the light is followed by chlorophyll formation. The addition of *Azotobacter* to "dark" cultures is also claimed to be followed by chlorophyll formation.—A. Bonazzi.

2143. HEPBURN, JOSEPH SAMUEL, E. QUINTARD ST. JOHN, AND FRANK MORTON JONES. **The absorption of nutrients and allied phenomena in the pitchers of the Sarraceniaceae.** Jour. Franklin Inst. 189: 147-184. 7 fig. 1920.—The general structure of the leaves of the various species of the Sarraceniaceae, which are all found on the American continent, are described. The nectar glands of the pitchers seem to exude *d*-fructose. The "wetting or narcotic principle" in the pitcher liquor of some of the species does not seem to be a saponine. Active proteolytic enzymes are present in all species of *Sarracenia* except *S. psittacina*, which was not studied in this respect. *Darlingtonia*, a monotypic genus, seems not to have such an enzyme. Closed pitchers are free from bacteria, but open ones soon contain proteolytic bacteria. Milk, meat broth, and some other substances cause the secretion of additional pitcher liquor. This liquid tends to return to its normal reaction to litmus in a few days after acids or alkalis are introduced. Water is absorbed by the plant from the pitchers at a slower rate than nitrogenous solutes and more rapidly than neutral phosphate in solution. The pitcher liquor increases when a phosphate buffer with a nitrogenous substance in solution is introduced, and the nitrogen is absorbed. "The per cent of the introduced nitrogenous compound or phosphate absorbed usually increased with the period of absorption." The lithium ion was detected in the tissues of *Sarracenia purpurca* after neutral lithium citrate had been introduced into the pitchers. Decrease in nitrogen and phosphorus was the criterion used to determine the absorption of these elements from the pitcher liquor.—Ernest Shaw Reynolds.

2144. STROWD, W. H. **The determination of nitrites and nitrates in plant tissue.** Soil Sci. 10: 333-342. 1920.—The CARON method and the nitron method of BUSCH as well as the KJELDAHL-GUNNING-ARNOLD method and the Kjeldahl method modified to include nitrates are unsatisfactory for determining nitrates in plant tissue. The DEVARDA and SCHLOESSING methods with modifications can be used. The modifications are described.—W. J. Robbins.

2145. STROWD, W. H. **The relation of nitrates to nodule production.** Soil Sci. 10: 343-356. 1920.—The concentration of nitrates in the cell sap of the roots of soy bean is many times the concentration of nitrates in the soil. The concentration increases with arrested photosynthesis and with increase in nitrate concentration in the soil, but not proportionately. Nitrates have little effect upon the hydrogen-ion concentration of the plant juice. The amount of reducing sugar in plants decreases with increase in nitrate. The concentration of nitrate present in the plant sap when nodule production is inhibited is sufficient to prevent the growth of *Rhizobium leguminosarum* in the soil.—W. J. Robbins.

METABOLISM (ENZYMES, FERMENTATION)

2146. FERNBACH, A., ET M. SCHOEN. **Le rôle de l'aldehyde dans la fermentation alcoolique.** [The role of acetic aldehyde in alcoholic fermentation.] Bull. Inst. Pasteur 18: 385-406. 1920.—A review and a synthetic study of our knowledge on the subject. The work of NEUBAUER and FROMHERTZ on the breakdown of the amino acids in the animal body by the path of alanin- α -amino propionic acid-pyruvic acid-acetaldehyde-ethyl alcohol is taken as a starting point for the review. The work of NEUBERG and KARZAG, Neuberg and associates, Fernbach and Schoen, Mazé, LINTNER and LIEBIG, J. B. DUMAS, CONNSTEIN, and LEUDEKE

has shown that the above reactions can be brought about by yeast juice and are due to a special enzyme which has been named carboxylase, since it has the power of forming CO_2 from the carboxylic group. This same enzyme has been found active in various organisms, among which are various forms of *Oidium* and several bacterial species. The work of Neuberg and REINFURTH showed the rôle of sulphites in the production of acetaldehyde by the yeast cell, and the work of Neuberg and KREB led to the assumption that methylglyoxal was formed as one of the steps in the action, a substance which could easily yield glycerin. Thus the classical formula of fermentation would take the form of $\text{C}_6\text{H}_{12}\text{O}_6 = \text{CH}_3\text{COH} + \text{CO}_2 + \text{C}_3\text{H}_5(\text{OH})_3$, and in presence of sulphites the action would be symbolized by $\text{C}_6\text{H}_{12}\text{O}_6 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{O} = \text{C}_3\text{H}_5(\text{OH})_3 + \text{CH}_3\text{CH}(\text{OH})\text{O}.\text{SO}_2\text{Na} + \text{NaHCO}_3$. In 1919 Neuberg and HIRSCH have shown that the living yeast if allowed to act in an alkaline medium in absence of sulphites forms acetic acid in large quantities. A direct oxidation of the aldehyde can not be assumed, since the action is taking place in an atmosphere of CO_2 ; furthermore, the ratio of acetic acid to glycerin is 1:3. Applying the CANNIZZARO reaction to the oxidation of acetaldehyde and uniting it with the reaction of Neuberg and Reinfurth we have: $2\text{CH}_3\text{COH} + \text{H}_2\text{O} = \text{CH}_3\text{CH}_2\text{OH} + \text{CH}_3\text{COOH}$ and $2\text{C}_6\text{H}_{12}\text{O}_6 = 2\text{C}_3\text{H}_5(\text{OH})_3 + 2\text{CO}_2 + 2\text{CH}_3\text{COH}$. A list of the articles cited in the review is appended.—A. Bonazzi.

2147. FRED, E. B., AND W. H. PETERSON. The fermentation of xylose by bacteria of the aerogenes, paratyphoid B., and typhoid groups. Jour. Infect. Diseases 27: 539-549. 1920.—The medium used consisted of fresh yeast extract, containing 0.5 per cent dibasic potassium phosphate, 0.5 per cent peptone and 2 per cent xylose. After the organisms were grown for 24 hours in the Smith fermentation tube, 2 cc. of sterilized mercury were added to check the diffusion and escape of carbon dioxide. Xylose was found to be attacked by the organisms of the aerogenes-typhoid group with the production of volatile, nonvolatile, and gaseous substances, the by-products of the organisms included in this group differing quantitatively and qualitatively. The products of fermentation with *B. lactis aerogenes* are essentially carbon dioxide, hydrogen, and alcohol, and small amounts of a volatile acid. The products of fermentation of *B. paratyphoid* B. are formic, acetic, butyric, lactic, and succinic acids, ethyl alcohol, carbon dioxide, and hydrogen. The typhoid group does not attack xylose so readily as the other organisms; the chief substances formed are formic, acetic, butyric, and succinic acids, alcohol, and a trace of carbon dioxide.—Selman A. Waksman.

2148. KLÖCKER, ALB. Recherches sur les organismes de fermentation. IV Contribution à la connaissance de la faculté assimilatrice de douze espèces de levure vis-à-vis de quatre sucres. [Researches on organisms of fermentation. Contribution to the knowledge of the assimilation of four sugars by twelve species of yeasts.] Compt. Rend. Trav. Lab. Carlsberg 147: 1-40. 1919.—Seven species of *Saccharomyces*, *S. cerevisiae*, *S. Carlsbergensis*, *S. ellipsoideus*, *S. Pastorianus*, *S. turbidans*, *S. Marxianus*, *S. fragilis*, *Zygosaccharomyces Priorianus*, *Saccharomycodes Ludwigii*, *Debaryomyces globosus*, *Schwanniomyces occidentalis*, and *Schizosaccharomyces octosporus* were tested for ability to assimilate dextrose, maltose, lactose, and saccharose, using 3 different sources of nitrogen, viz., "yeast water," asparagin, and peptone. The index of assimilation was cell multiplication; the number of cells in a culture was determined at the time of sowing and after various periods of incubation by means of a haematimeter. The sugars were added singly to yeast water or to a synthetic nutrient solution consisting of MgSO_4 , KH_2PO_4 , and either asparagin or peptone. Chemicals of highest purity were used but the difficulty of avoiding introduction of minute traces of nitrogen in the water, sugars, or salts used in the medium is pointed out. No statement as to the utilization of a sugar by a given species is complete without specifying the source of nitrogen, since both assimilation and cell multiplication vary with this. Yeast water was the most favorable source of nitrogen, but peptone served as well in many cases, while asparagin was either a favorable source or not utilized, depending on the species. A yeast may sometimes assimilate a sugar which it is incapable of fermenting. No yeast organism has yet been found capable of assimilating free atmospheric nitrogen. Dextrose and saccharose, in the presence of yeast water, are utilized by all species studied; maltose is used by all but one, *Saccharomyces fragilis*, which is unique in its ability to assimilate lactose.—F. Weiss.

2149. KNUDSON, LEWIS. The secretion of invertase by plant roots. *Amer. Jour. Bot.* 7: 371-379. 1 fig. 1920.—Reducing sugars frequently appear in culture solutions containing sucrose. In a series of culture experiments with corn and Canada field peas the production of these sugars was studied. Evidence is given that their appearance is not due to the reaction of the culture solution; or to the secretion of invertase by the roots (since the amount of reducing sugar is not increased by incubation). The author believes that these sugars are produced in the root and excreted into the culture solution.—*E. W. Sinnott.*

2150. PIEDALLU, ANDRÈ, PHILIPPE MALVEZIN, ET LUCIEN GRANDCHAMP. Sur le traitement de la casse bleue des vins. [The treatment of blue cassia of wines.] *Compt. Rend. Acad. Sci. Paris* 170: 1129-1131. 1920.

2151. RAVENNA, C. Sintesi di un peptide dall'acido aspartico cogli enzimi vegetali. [Synthesis of a peptide of aspartic acid by vegetable enzymes.] *Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.)* V, 29¹: 55-58. 1920.—A mixture of ground spinach foliage, asparagine, and water, with toluol as an antiseptic, was kept in an incubator 20 days. From the liquid a yellowish precipitate was thrown down with basic acetate of lead. This was purified and a considerable quantity of oxalic acid separated from it leaving a substance having some properties characteristic of the dipeptid of aspartic acid. Control solutions were compared with this. It is held that asparagine may prove to be one of the first steps in the formation of proteins in plants.—*F. M. Blodgett.*

2152. RAVENNA, C. Sintesi di un peptide dell'acido aspartico cogli enzimi vegetali. [The synthesis of an aspartic acid peptide by means of enzymes from vegetable cells.] *Gazz. Chim. Ital.* 50: 251-255. 1920.—See preceding entry 2151.

2153. SCHOELLHORN, KURT. Sur la fermentation de quelques levures des nectars des plantes d'hiver. [Fermentation produced by certain yeasts obtained from the nectar of winter plants.] *Bull. Soc. Bot. Genève* 11: 154-190. 29 fig. 1919.—A physiological study is presented for 12 strains of *Torula* which were isolated from the nectar of various flowering plants. One of the organisms is described as a new species and assigned to a new genus, *Nectaromyces cruciatus* Schödl.—*W. H. Emig.*

ORGANISM AS A WHOLE

2154. HALL, IVAN C. Practical methods in the purification of obligate anaerobes. *Jour. Infect. Diseases* 27: 576-590. 1920.—Attention is called to the failure of some early investigators to secure unquestionably pure cultures of obligate anaerobes. A critical review of the present status of surface culture, deep culture, and microscopic methods is given. Selective enrichment of the medium and the elimination of aerobic contamination through selective heating and selective cultivation, followed by the method of isolation by deep cultivation in glucose agar, is found most practical for the purification of obligate anaerobes.—*Selman A. Waksman.*

2155. PANTANELLI, E. Influenza della nutrizione e dell'attività radicale sul colasso e il disseccamento prodotti dal freddo. [Influence of nutrition and root activity on the injury produced by cold.] *Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.)* V, 29¹: 66-71. 1920.—Chick pea and bean plants growing in pots in fine earth or quartz sand to which had been added various nutrient salts were exposed to low temperatures and compared with check plants. The author concludes that the sufferance of each cell is directly proportional to the outgo of water during cooling. The richness in sugars and other carbohydrates, an abundant supply of phosphates, and a scarcity of autodigestive enzymes enable the plasma to hold more tenaciously to water. Acidity and an abundant phosphate supply in the soil favor recovery while alkalinity and abundance of nitrogen render plants more delicate. Tests were also made to determine the effect of different amounts of soil moisture and the effect of subjecting different parts of the plant to chilling temperatures. It is concluded

that the condition of the roots is of the greatest importance in determining whether a plant recovers or not, i.e., whether the roots are in condition to supply the water to replace that removed from the tissues by the low temperatures.—*F. M. Blodgett.*

2156. PETERS, R. A. **Nutrition of the protozoa. The growth of *Paramoecium* in sterile culture medium.** Jour. Physiol. [London] 53^o: cviii-cix. 1920.—A medium for the successful cultivation of a pure culture of *Paramoecium* contained the following: NaCl, KCl, CaCl₂, Na₂HPO₄, KH₂PO₄, MgSO₄, NaHCO₃, phenol red, glucose, histidine, arginine, leucine, ammonium lactate, and traces of FeCl₃, KI, and MnSO₄. When single amino acids are supplied, histidine, arginine, or leucine gives a much more rapid growth than tryptophane. Galactose and fructose, but not maltose, may be substituted for glucose.—*Ernest Shaw Reynolds.*

GROWTH, DEVELOPMENT, REPRODUCTION

2157. FRIESNER, RAY C. **Daily rhythms of elongation and cell division in certain roots.** Amer. Jour. Bot. 7: 380-407. 2 pl. 1920.—Previous work on rhythm of elongation and cell division in plants is summarized. Hourly observations were made on the elongation of root tips of several species which were grown in a dark room and kept under constant temperature. Material from roots growing under these conditions was killed every 2 or 3 hours and studied microscopically to determine rate of cell division. Elongation in all cases was found to proceed in a rhythmical manner, 2 or more waves occurring during a 24-hour period. The time of occurrence of maxima and minima is dependent upon the time of initiation of metabolic activity rather than upon time of day by the clock. Cell division proceeded in a similar rhythmic fashion. The maxima and minima for elongation as compared to cell division were generally found to alternate with one another, only rarely occurring simultaneously. The author suggests that this alternation is perhaps due to the lack of sufficient energy to permit both processes to go on at the same time at their maximum rates. He believes that this reciprocal relation between elongation and cell division accounts for most of the rhythms found in these plants.—*E. W. Sinnott.*

2158. MURRILL, WM. A. **The dendrograph—an instrument that keeps tabs on tree growth.** Sci. Amer. 122: 595. 3 fig. 1920.

2159. PFEIFFER, T., UND W. SIMMERMACHER. **Über den Einfluss der Steine im Boden auf das Wachstum der Pflanzen.** [The influence of stones in the soil upon the growth of plants.] Landw. Versuchssta. 93: 49-63, 277-284. 1919.—Two series of experiments to determine the effect of stones in the soil upon the growth of plants are reported. In the first series oats was used as the test crop, and in the second carrots. The experiments were conducted in earthenware pots, equal weights (3.4 kgm.) of a loam soil being used in all cases. Gravel stones from 1 to 3 cm. in diameter were mixed with the soil in 3 series of pots in 3 different proportions, namely 25, 50, and 75 per cent. The cultures were compared with a control series containing only the 3.4 kgm. of soil. All pots were regularly watered to saturation with uniform nutrient solutions.—The results show practically the same top and root development in all cases with both oats and carrots, and lead to the conclusion that with equal amounts of water and nutrients, the presence of stones in the soil had no influence upon plant production.—*A. T. Wiancko.*

2160. REED, H. S. **Slow and rapid growth.** Amer. Jour. Bot. 7: 327-332. 2 fig. 1920.—The growth in length of shoots from pruned and unpruned apricot trees was measured weekly during the growing season. A close correspondence was found between the growth rates in these two cases and the differential equation for growth rate previously proposed by the author [$x = a(1 - e^{-kt})$, where x is the size of the organism at time t , a the final size attained, and k a constant.] The rate of growth of these shoots, which is much higher in pruned than in unpruned trees, thus seems to depend upon the final length which they attain. The author suggests that growth is some sort of a catalytic process, the organism being the end product of a process in which a catalyst acts upon a substrate.—*E. W. Sinnott.*

2161. SCHOOTEDEN-WÉRY, J. Quelques expériences de régénération de bourgeons chez les racines de chicorées. [Regeneration of buds on the roots of chickory.] Acad. Roy. Belgique, Bull. Cl. Sci. 1920: 152-166. 13 fig. 1920.—These experiments were made with the roots of the vegetable known as Brussels chickory, and they have demonstrated a material of the highest order for the investigation of polarity.—The nature of the work is revealed by the following conclusions: (1) Roots of the chickory manifest a bud polarity which is strongly marked; in any position the proximal region produces the buds. (2) This bud polarity may not suffer inversion but nevertheless is affected by the external factors gravity and light which intervene in the production of buds at the opposite pole. These external factors supplement the internal factors and produce the same effects.—*Henri Micheels*.

2162. WALLER, A. D. On the so-called growth of amputated parts of plants. Jour. Physiol. [London] 54^{1/2}: xix-xx. 1920.—An adverse criticism of demonstrations made by Sir J. C. BOSE of his "crescograph" by which growth of amputated tips of hyacinth leaves was claimed. The author regards these crescograph records as inconclusive, both because of possible instrumental and physical errors and because of mere turgor changes. "Growth is an irreversible change and is attended by continuous gain of length," while "turgor is a reversible change; gain or loss of water causes gain or loss of length."—*Ernest Shaw Reynolds*.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2163. B., V. H. Movements of plants. [Rev. of: BOSE, J. C. Life movements in plants. Trans. Bose Res. Inst. Calcutta 2: 253-597 + i-xv. 1919.] Nature 105: 416-417. 1920.—Reviewer finds the work not well related to that of previous investigators.—*O. A. Stevens*.

2164. BOSE, J. C. Life movements in plants. Trans. Bose Res. Inst. Calcutta 1: 1-252 + i-xxiv. Fig. 1-92. 1918; 2: 253-597 + i-xv. Fig. 93-220. 1919.—The 2 volumes (continuously paged) constituting the Transactions of the Institute for 1918 and 1919 present the results of experimental work on the "life movements in plants" under the following major subdivisions: (1) response of plant organs, (2) growth and its responsive variations, (3) tropisms, and (4) night and day movements. The special topics investigated and the names of those assisting, where such assistance was rendered, are given below: i.—The problem of movements in plants. ii.—The "praying" palm tree (assisted by N. N. NEOGI). iii.—Action of stimulus on vegetable tissues (assisted by N. N. S. GUPTA). iv.—The diurnal variation of moto-excitability in *Mimosa*. v.—Response of petiole-pulvinus preparation of *Mimosa pudica* (assisted by S. C. DAS). vi.—On conduction of excitation in plants. vii.—On electric control of excitatory impulse. viii.—Effect of indirect stimulus on pulvinated organs (assisted by G. DAS). ix.—Modifying influence of tonic condition on response (assisted by G. DAS). x.—The high magnification crescograph for researches on growth (assisted by G. DAS). xi.—Effect of temperature on growth (assisted by S. C. DAS). xii.—The effect of chemical agents on growth (assisted by G. DAS). xiii.—Effect of variation of turgor and of tension on growth. xiv.—Effect of electric stimulus on growth (assisted by G. DAS). xv.—Effect of mechanical stimulus on growth. xvi.—Action of light on growth (assisted by G. DAS). xvii.—Effect of indirect stimulus on growth (assisted by G. DAS). xviii.—Response of growing organs in state of sub-tonicity. xix.—Resumption of autonomous pulsation and of growth under stimulus. xx. Action of light and warmth on autonomous activity. xxi.—A comparison of responses in growing and non-growing organs (assisted by G. DAS). xxii.—The balanced crescograph. xxiii.—On tropic movements. xxiv.—Tropic curvature with longitudinal transmission of effect of stimulus (assisted by G. DAS). xxv.—Tropic curvature with transverse transmission of effect of stimulus (assisted by G. DAS). xxv.—Mechanotropism: twining of tendrils (assisted by G. DAS). xxvii.—On galvanotropism (assisted by G. DAS). xxviii.—On thermonastic phenomena (assisted by S. C. DAS). xxix.—On phototropism. xxx.—Dia-phototropism and negative phototropism (assisted by G. DAS). xxxi.—The relation between the quantity of light and the induced phototropic curvature (assisted by S. C. DAS). xxxii.—The phototropic curve and its characteristics. xxxiii.—The trans-

mitted effect of photic stimulation (assisted by J. SIRCAR). xxxiv.—On photonastic curvatures (assisted by G. DAS). xxxv.—Effect of temperature on phototropic curvature (assisted by G. DAS). xxxvi.—On phototropic torsion (assisted by S. C. DAS). xxxvii.—Radio-thermotropism (assisted by G. DAS). xxxviii.—Response of plants to wireless stimulation (assisted by G. DAS). xxxix.—Geotropism. xl.—Geo-electric response of shoot (assisted by S. C. GUHA). xli.—The mechanical and electrical response of root to various stimuli. xlii.—Geo-electric response of root (assisted by S. C. GUHA). xliii.—Localization of geo-perceptive layer by means of the electric probe (assisted by S. C. GUHA). xliv.—On geotropic torsion (assisted by G. DAS). xlv.—On thermo-geotropism. xlv.—Diurnal movements in plants. xlvii.—Diurnal movement due to alternation of light and darkness (assisted by L. M. MUKHERJI). xlviii.—Diurnal movement due to variation of temperature affecting growth (assisted by L. M. MUKHERJEE). xlix.—Daily movement in plants due to thermo-geotropism (assisted by L. M. MUKHERJI). l.—The after-effect of light (assisted by S. C. DAS). li.—The diurnal movement of the leaf of *Mimosa*.—*F. S. Wolpert*.

2165. MASSART, J. *Recherches sur les organismes inférieurs. VII. Les réflexes chez les Polyporées.* [Reactions in the Polyporaceae.] Acad. Roy. Belgique Bull. Cl. Sci. 1920: 82-90. 10 fig. 1920.—In the Polyporaceae one may recognize the reactions due to 3 causal stimuli as follows: (1) Light which intervenes in the production of the fruit body; (2) gravity in response to which the fungus differentiates its fruit body and orients the tubes of the hymenophore; and (3) contact which inhibits the growth of the hyphae.—*Henri Micheels*.

2166. RICOME, H. *Sur des phénomènes de torsion comparables à l'enroulement des vrilles provoqués expérimentalement.* [The phenomena of torsion experimentally stimulated and comparable to the curling of tendrils.] Compt. Rend. Acad. Sci. Paris 170: 1399-1401. 1920.—Bean stems horizontally placed and fixed by two pins in the region of growth display a torsion between these pins of 180° in 24 hours. It occurs in darkness as well as light, but may be brought about by heliotropic instead of geotropic stimulation. It occurs in detached stems and also does not seem to be related to the distribution of nodes and internodes.—*C. H. Farr*.

TEMPERATURE RELATIONS

2167. BIGELOW, W. D., AND J. R. ESTY. *The thermal death point in relation to time of typical thermophilic organisms.* Jour. Infect. Diseases 27: 602-617. 1920.—A method is presented for determining the length of time, at different temperatures, necessary to completely destroy a definite known concentration of spores in a medium of known hydrogen-ion concentration. The time necessary decreases as the temperature increases and as the P_H value is increased; at a given reaction and temperature, the larger the number of spores present in the medium the longer is the time necessary to destroy them.—*Selman A. Waksman*.

RADIANT ENERGY RELATIONS

2168. ANONYMOUS. *Putting plants on daylight rations.* Sci. Amer. 122: 624, 634. 4 fig. 1920.—There is described a recent discovery by W. W. GARNER and H. A. ALLARD. [Effect of the relative length of day and night and other factors of the environment on growth and reproduction in plants. Jour. Agric. Res. 18: 553-605. Pl. 64-79, 35 fig. 1920.—See Bot. Absts. 5, Entry 22] showing that too many hours of daylight in comparison with the number of hours of darkness will prevent many kinds of plants from flowering and fruiting.—*Chas. H. Otis*.

2169. MASSART, J. *L'action de la lumière continue sur la structure des feuilles.* [The action of continuous light on the structure of leaves.] Acad. Roy. Belgique Bull. Cl. Sci. 1920: 37-43. 1920.—The author repeated the experiments of BONNIER but with results contradictory to those of the latter.—For each species the author proceeded as follows: there were six lots of plants, entirely comparable, which were exposed respectively, (1) to continuous light; (2) to darkness; (3) to light during 12 hours and to darkness during 12 hours (one lot was

exposed from 7 to 19 hours, and the other from 19 to 7 hours with no difference whatever between the two lots); (4) to light from 7 to 13 hours and to darkness from 13 to 7 hours; and (5) to light from 13 to 7 hours and to darkness from 7 to 13 hours.—The experiments included the following species. Hepatics: *Conocephalus conicus*, *Lunularia cruciata*, *Marchantia polymorpha*, *M. emarginata*, *Pellia epiphylla*, *P. endiviaefolia*. Lycopodiaceae: *Selaginella helvetica*. Phanerogams: *Notoscordum fragrans*, *Sempervivum tectorum*, *Aegopodium Podagraria*, *Lysimachia Nummularia*, *L. Nummularia* var. *aurea*, *Vinca minor*, *Glechoma hederaceum*, *Ajuga reptans*, *A. reptans* var. *atropurpurea*, *Campanula persicifolia*.—Nothing was observed which showed the least difference between the effects of continuous and discontinuous illumination. In none was the structure or the form of the leaves developed in constant illumination similar at all to that of those produced in darkness. Illumination of 24 hours of the day, of 18 hours, of 12 hours, and of 6 hours act in general in the same manner upon the assimilatory organs. The influence of light upon the form and structure and also upon the production of chlorophyll depends therefore much more upon its intensity than upon its duration. In the majority of the experiments a light of 400 candle power at a distance of 1 meter was sufficient.—*Henri Michels*.

2170. NEGRI, G. Su un musco cavernicolo crescente nell'oscurità assoluta. [A moss growing in absolute darkness.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) V, 29: 159-162. 1920.—A moss identified as *Isopterigium Muellerianum* (Schor.) Lind. is described and reported to have been collected by Martino Maccagno in the grotto of Trebiciano (Triest) in the Lindner cavern at a depth of 275 meters. The entrance is so narrow and crooked that light does not penetrate to this depth. Other cases of plants growing in partial or complete darkness are reviewed.—*F. M. Blodgett*.

2171. WIESSMANN, H. Einfluss des Lichtes auf Wachstum und Nährstoffaufnahme beim Hafer. [Influence of light on the growth and the absorption of nutrient salts in the oats.] Landw. Jahrb. 35: 183-190. 1919.—The difference in the light received by oat plants standing (1) on a roof and (2) in a court caused differences in yield and in the quantities of nutrient salts absorbed. The oats on the roof stood better, had stronger stalks, blossomed and ripened earlier, and yielded more of both grain and straw than the plants in the court. The percentage of nitrogen, potash, and phosphoric acid was much greater in the plants grown in the more diffuse light, i.e., in the court, but the absolute amounts were much less.—*A. J. Pieters*.

TOXIC AGENTS

2172. BERTRAND, GABRIEL, ET MME. ROSENBLATT. Action de la chloropicrine sur quelques fermentations bactériennes. [The effect of chloropicrine on bacterial fermentations.] Compt. Rend. Acad. Sci. Paris 170: 1468-1471. 1920.—This is a study of lactic acid fermentation, ammoniacal fermentation, and the fermentation of sorbose in relation to the presence of chloropicrine. It was found that there is a distinct toxic effect which is comparable in some cases to that of the more powerful antiseptics.—*C. H. Farr*.

2173. MAQUENNE, ET DEMOUSSY. Un cas d'action favorable du cuivre sur la végétation. [An instance of the favorable effect of copper on vegetation.] Compt. Rend. Acad. Sci. Paris 170: 1542-1545. 1920.—Lettuce, peas, and wheat were grown in culture solutions at low temperature and in weak light. Lettuce lived 33 days; wheat and peas 9 days. To other solutions copper sulphate was added to the extent of 0.02 to 0.2 mg. per liter. The presence of copper increased the length of life in all cases and the dry weight in some instances.—*C. H. Farr*.

2174. MEDES, GRACE, AND J. F. McCLENDON. Effect of anesthetics on various cell activities. Jour. Biol. Chem. 42: 541-568. 1920.—The plant used was *Elodea*, and the anesthetics, alcohol, ether, chloroform, and chlorotone. The cell activities tested were (1) consumption of O₂, (2) liberation of CO₂ as measured by P_H changes in the solutions, (3) rotation of chloroplasts, (4) photosynthesis, (5) diffusion of chlorides from the cell. Increase or decrease in

the rate of activities is in comparison with the rate in water.—Consumption of O_2 increased in the following: alcohol, 1, 1.5, 3, and 6 per cent; ether, 1.5, 3, 5, and 8 per cent; chloroform, 0.05, 0.15, 0.3 per cent; and chloretone, 0.05 per cent. It decreased in 15 per cent alcohol and in 0.1 per cent chloretone.—The P_H value increased in all of the above solutions except in the 1 per cent alcohol and the 0.05 per cent chloroform, and in all cases the greatest change in P_H was in the highest concentration.—The rate of rotation of chloroplasts was increased in 1.5 and 3 per cent alcohol, and in 0.05 per cent chloroform. It was decreased in 6 per cent alcohol, 1.5 and 3 per cent ether, and in 0.05 per cent chloretone. It was completely stopped in 15 per cent alcohol, 5 and 8 per cent ether, 0.15 and 0.3 per cent chloroform, and in 0.10 per cent chloretone.—Photosynthesis was decreased in all strengths of alcohol, ether, and chloroform used, and stopped by the higher concentrations. It was unchanged in the strengths of chloretone used.—The diffusion of chlorides was unchanged in 1 per cent alcohol, but was greatly increased in all higher concentrations and by all other solutions used.—Plasmolysis was produced by 15 per cent alcohol, 8 per cent ether, and 0.30 per cent chloroform.—The amount of oxygen used increased through the lower concentrations of the anesthetic, reached a maximum in the solution just failing to cause permanent injury, and then decreased in those causing irreversible changes. Such an effect indicates that in respiration at least two separate processes must be involved.—Of all the cell processes photosynthesis seems to be the most readily affected by alcohol, ether, and chloroform; but as these are all well-known solvents of chlorophyll such a result is probably to be expected.—*G. B. Rigg.*

MISCELLANEOUS

2175. B., W. E. *American agricultural research.* [Rev. of: *Jour. Agric. Res.* 18, Nos. 7 and 8. 1920.] *Nature* 105: 310–311. 1920.—This review is of papers on physiological balance, seed treatment, and control of insects by parasites.—*A. A. Stevens.*

2176. LEVINE, B. S., AND F. P. VEITCH. *Testing the mildew resistance of textile.* *Jour. Indust. Eng. Chem.* 12: 139–141. 1920.—A method to test the mildew resistance of textiles is described which is simple in execution and the details of which have been standardized.—*Henry Schmitz.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

GENERAL

2177. GARDNER, WILLARD. *The capillary potential and its relation to soil-moisture constants.* *Soil Sci.* 10: 357–359. 1 fig. 1920.—A discussion is given of BRIGGS' equations (*U. S. Dept. Agric. Bur. Soils Bul.* 45) and curves are drawn satisfying those equations.—*W. J. Robbins.*

2178. NOTTIN, P. *Sur le pouvoir absorbant de la terre vis-à-vis du manganèse.* [On the absorbent power of the soil for manganese.] *Compt. Rend. Acad. Sci. Paris* 171: 44–47. 1920.

2179. TAMHANE, V. A. *Comparison of salt lands in the Deccan and in Sind.* *Agric. Jour. India* 15: 410–417. 1920.—The paper discusses the geological origin of the salt lands and compares the regions as to the immediate cause of the salt deposits. Chemical analyses of the soils, river waters, etc., which lead to the salt deposits are given. *Lathyrus sativus* and *Phaseolus radiatus* failed to grow in soil containing 0.48 per cent of soluble salts, 66 per cent of which was Na_2SO_4 . Several crops have been found to resist the effects of soluble salts in concentrations beyond 0.1 per cent. The limit of tolerance shown by some of the common crops is tabulated. Rice was found to tolerate 940 parts of soluble salts per 100,000 of water.—*F. M. Schertz.*

2180. WESTON, ROBERT SPURR. **By-products from sewage sludge.** Amer. Jour. Public Health 10: 405-409. 1920.—A discussion of the treatment of sewage from the standpoint of recovering by-products—chiefly fats and fertilizing materials. The MILES process is said to give the best study for such recovery. The claim is made “that many American sewages contain enough fats and fertilizer constituents to make the problem worth consideration.” Additional experiments necessary to put the recovery on a profitable basis are suggested.—C. A. Ludwig.

INFLUENCE OF BIOLOGICAL AGENTS

2181. GREAVES, J. E., AND E. G. CARTER. **Influence of moisture on the bacterial activities of the soil.** Soil Sci. 10: 361-386. 4 fig. 1920.—The ammonification, nitrification, and nitrogen fixation of 22 soils at varying moisture contents were determined. The soils varied from a loose sand to a tight clay, from soils with little or no organic matter to soils high in organic matter. The moisture-holding capacities varied from 31 to 78 per cent. Every soil gave a maximum ammonification at a water content of 60 per cent of the moisture-holding capacity. Maximum nitrification occurred at 50-60 per cent. Nitrogen fixation in many soils showed two maxima, one at 50-60 and another at 70-80 per cent. Equations for the optimum water content for bacterial activities are given based on the formulae of BRIGGS for moisture equivalent, wilting coefficient, and hygroscopic coefficient.—W. J. Robbins.

2182. HODGSON, R. W. **Conservation in the use of manure.** Monthly Bull. Dept. Agric. California 8: 512-517. 1919.—Considerable loss of manure results through aerobic decay and fermentation both in the stable and in the orchard while in piles prior to distribution; 50-75 per cent of the nitrogen is lost. Urine should not be allowed to drain away. It seems desirable to plough down manure rather deeply, 12 to 15 inches, so that it lies in the vicinity of the feeding roots and undisturbed by constant cultivation. At that depth manure is unaffected by atmospheric conditions and has optimum conditions for transformation into available plant food.—E. L. Overholser.

2183. JOSHI, N. V. **Studies in biochemical decomposition of cow-dung and urine in soils.** Agric. Jour. India 15: 398-409. 1920.—Non-nitrogenous manures (such as cellulose) lower the amounts of nitrates formed from organic manures. Urine gives the greatest amount of nitrates and nitrifies at once while cow-dung does not nitrify when fresh. Storage of sheep-dung and urine in a pit is not desirable because of nitrogen losses. CO₂ production and nitrification are not necessarily correlated.—F. M. Schertz.

2184. RUSSELL, E. J. **The partial sterilization of soils.** Jour. Roy. Hort. Soc. 45: 237-246. 1919.—Tests of toluene, carbon bisulfide, carbolic acid, and formaldehyde as soil sterilizers in comparison with heating are reported, and a general discussion of soil protozoa is given.—J. K. Shaw.

FERTILITY STUDIES

2185. MCFADZEAN, G. S. **Top dressing pasture lands.** Jour. Dept. Agric. Victoria 18: 408-412. 4 fig. 1920.—Good results were secured by top dressing with superphosphate and bone meal in the Portland District. Clover and rye grass, the native grasses, have improved with the use of fertilizers and the pastures support a larger number of cattle.—J. J. Skinner.

2186. NORRIS, R. V. **The exhaustion of Indian soils and the methods by which this may be remedied.** Agric. Jour. India 15: 433-443. 1920.—Attention is called to the use of manual substances which are now exported but may be used to a greater advantage at home.—F. M. Schertz.

2187. RAE, F. G. **Electro-culture.** Jour. Dept. Agric. Victoria 18: 385-394. 1920.—A review of experiments showing the effect of electric currents in soil on the growth of plants. The experiments cited show generally an increase.—J. J. Skinner.

2188. WILLIAMS, C. B., W. F. PATE, E. C. BLAIR, S. C. CLAPP, AND F. J. MEACHAM. Relative value of acid phosphate and rock phosphate on North Carolina soils. Bull. North Carolina Dept. Agric. 41⁶: 3-22. Fig. 13. 1920.—Relative availability is indicated by crop yields where acid phosphate or rock phosphate was used with either stable manure, lime, or the common mineral fertilizer elements.—F. A. Wolf.

2189. WRANGEL, MARGARETE. Ein estländisches Rohphosphat und seine Wirkung auf verschiedene Pflanzen. [An Esthonian raw phosphate and its effect upon various plants.] Landw. Versuchssta. 96: 1-44. Pl. 1-3. 1920.—Comparisons of Esthonian phosphate with Thomas phosphate, apatite, phosphorite, staffelite, dicalcium and tricalcium phosphates show it to be more available than the other raw phosphates. Pot experiments conducted at Hohenheim showed that plants differ considerably in their ability to utilize raw phosphates. Mustard, buckwheat, clover, rape, and vetch showed best results. With these plants the Esthonian raw phosphate about equalled the Thomas phosphate. Rye, flax and maize showed little ability to utilize the raw phosphates.—A. T. Wiancko.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

SPERMATOPHYTES

2190. ANONYMOUS. Decades Kewenses. Decas XCVI. Bull. Misc. Inf. Kew 1920: 108-112. 1920.—The following species are described as new: *Miliusa dolichantha* Craib, *Vatica Shingkeng* Dunn, *Rubus Burkillii* Rolfe, *Eugenia arborensis* Dunn, *Begonia arborensis* Dunn, *B. Burkillii* Dunn, *B. iridescens* Dunn, *B. scintillans* Dunn, *Sadiria Boweri* Dunn, *Arundinella intricata* Hughes.—E. Mead Wilcox.

2191. ANONYMOUS. Decades Kewenses. Decas XCVII. Bull. Misc. Inf. Kew 1920: 132-136. 1920.—The following species are described as new: *Rubus chambica* Rolfe, *Brassaiopsis magnifica* Dunn, *Ophiorhiza heterostyla* Dunn, *Psychotria arborensis* Dunn, *Agapetes marginata* Dunn, *A. nutans* Dunn, *Buddleia candida* Dunn, *Aeschynanthus monetaria* Dunn, *Rhinacanthus grandiflorus* Dunn, *Gomphostemma arborensis* Dunn.—E. Mead Wilcox.

2192. ANONYMOUS. New orchids: Decade XLVII. Bull. Misc. Inf. Kew 1920: 128-132. 1920.—The following species are described as new: *Eulophia Huttonii* Rolfe, *E. Boltonii* Harv. & Rolfe, *Lissochilus Rehmannii* Rolfe, *L. transvaalensis* Rolfe, *Polystachya natalensis* Rolfe, *Phalaenopsis latisejala* Rolfe, *P. Micholitzii* Rolfe, *Angraecum Hislopianum* Rolfe, *A. Bolusii* Rolfe, *Brownleea Fanniniæ* Rolfe.—E. Mead Wilcox.

2193. BENOIST, RAYMOND. Descriptions d'espèces nouvelles de Phanérogames. [Descriptions of new species of Phanerogams.] Bull. Mus. Hist. Nat. [Paris] 26: 184-188. 1920.—The following species are described as new to science: *Ononis zaiana*, *Bathysa difformis*, *Hypoestes longispica*, *H. capitata*, *H. multispicata*, *H. comosa*, and *H. oppositiflora*.—E. B. Payson.

2194. BRITTON, N. L., AND J. N. ROSE. The Cactaceae, descriptions and illustrations of plants of the Cactus family. Vol. II. 23 x 29 cm., 40 pl. (32 colored), 305 fig. Carnegie Inst. Washington Publ. 248. Vol. II. Sept. 9, 1920.—The subtribes, *Cereanae* and *Hylocereanae* of the tribe *Cereae*, are treated in this volume. Forty-seven genera and 276 species are recognized and are described fully with complete bibliography, type locality, distribution and list of previously published illustrations. There are 19 new genera, as follows: *Arrojadoa*, *Binghamia*, *Brachycereus*, *Browningia*, *Corryocactus*, *Deamia*, *Dendrocereus*, *Erdisia*, *Espostoa*, *Facheiroa*, *Jasminocereus*, *Leocereus*, *Machaerocereus*, *Mediocactus*, *Monvillea*, *Neoraimondia*, *Stetsonia*, *Wilmattæa*, and *Zehntnerella*.—There are 48 new species, as follows: *Acanthocereus*

albicaulis, *A. brasiliensis*, *A. colombianus*, *A. horridus*, *A. occidentalis*, *A. subinermis*; *Aporocactus Conzattii*; *Borzicactus Morleyanus*; *Cephalocereus barbadensis*, *C. brasiliensis*, *C. Gaumeri*, *C. Purpusii*, *C. Smithianus*, *C. Tweedyanus*, *C. Zehntneri*; *Cereus grenadensis*; *Facheiroa pubiflora*; *Harrisia aboriginum*, *H. Earlei*, *H. fragrans* Small, *H. Simpsonii*; *Hylocereus antiquensis*, *H. bronxensis*, *H. cubensis*, *H. venezuelensis*; *Lemaireocereus Cartwrightianus*, *L. Godingianus*, *L. humilis*, *L. longispinus*, *L. montanus*; *Leocereus bahiensis*; *Leptocereus Mazonii*, *L. prostratus*, *L. sylvestris*; *Monvillea diffusa*, *M. maritima*; *Mytillocactus Eichlamii*; *Nyctocereus oaxacensis*; *Pachycereus Gaumeri*; *Selenicereus brevispinus*, *S. Murrillii*; *Trichocereus cuzcoensis*, *T. pachanoi*, *T. peruvianus*, *T. Shaferi*; *Weberocereus panamensis*; *Wilcoxia papillosa*; *Zehntnerella squamulosa*.—There are five new names, as follows: *Cephalocereus robustus*, *Cereus argentinensis*, *Erdisia Meyenii*, *Heliocereus elegantissimus*, and *Lemaireocereus Eichlamii*.—There are 92 new combinations, as follows: *Aporocactus Martianus*; *Arrojadoa penicillata*, *A. rhodantha*; *Binghamia acantha*, *B. melanostele*; *Borzicactus acanthurus*, *B. aurivillus*, *B. decumbens*, *B. Humboldtii*, *B. icosagonus*, *B. plagiotoma*, *B. sepium*; *Brachycereus Thouarsii*; *Browningia candelaris*; *Cephalocereus arrabidaei*, *C. catingicola*, *C. Dybowskii*, *C. euphorbioides*, *C. fluminensis*, *C. Goumellei*, *C. leucostele*, *C. Moritzianus*, *C. pentaedrophorus*, *C. phaeacanthus*, *C. piavhyensis*, *C. Robinii*; *Cleistocactus anguinus*, *C. smaragdiflorus*; *Corryocactus brachypetalus*, *C. brevistylus*, *C. melanotrichus*; *Deamia testudo*; *Dendrocereus nudiflorus*; *Erdisia Philippii*, *E. spiniflora*, *E. squarrosa*; *Espositoa lanata*; *Eulychnia iquiquensis*, *E. spinibarbis*; *Harrisia adscendens*, *H. Bonplandii*, *H. Guclichii*, *H. Martinii*, *H. platygona*, *H. pomancensis*, *H. tortuosa*; *Heliocereus einnabarinus*; *Hylocereus extensus*, *H. guatemalensis*, *H. monacanthos*, *H. polyrhizus*, *H. Purpusii*; *Jasminocereus galapagensis*; *Lemaireocereus Aragonii*, *L. chende*, *L. chichipe*, *L. deficiens*, *L. pruinosus*; *Leocereus Glaziovii*, *L. melanurus*; *Leptocereus Weingartianus*; *Machaerocereus Eruca*, *M. gummosus*; *Mediocactus coccineus*, *M. megalanthus*; *Monvillea amazonica*, *M. Cavendishii*, *M. insularis*, *M. phatnosperma*, *M. Spegazzinii*; *Neoraimondia macrostibas*; *Pachycereus lepidanthus*, *P. ruficeps*; *Selenicereus Donkelaarii*, *S. inermis*, *S. vagans*, *S. Wercklei*; *Stetsonia coryne*; *Trichocereus Bridgesii*, *T. candicans*, *T. chiloensis*, *T. coquimbanus*, *T. fascicularis*, *T. huascha*, *T. lamprochlorus*, *T. pasacana*, *T. Schickendantzii*, *T. strigosus*, *T. thelegonoides*, *T. thelegonus*, *T. Terscheckii*; and *Wilmattea minutiflora*.—In volume I, 8 genera and 302 species were recognized. There were: one new genus, *Tacinga*; 42 new species, *Nopalea Gaumeri*; *Opuntia aequatorialis*, *O. bahamana*, *O. bahiensis*, *O. bella*, *O. Boldinghii*, *O. borinquensis*, *O. brunnescens*, *O. burrageana*, *O. campestris*, *O. caribaea*, *O. depauperata*, *O. discolor*, *O. distans*, *O. Dobbiana*, *O. guatemalensis*, *O. Hickenii*, *O. ignota*, *O. juniperina*, *O. Macateeii*, *O. militaris*, *O. mortolensis*, *O. palmadora*, *O. pascoensis*, *O. Pennellii*, *O. Pittieri*, *O. Russellii*, *O. Shaferi*, *O. Skottsbergii*, *O. Soederstromiana*, *O. Soehrensi*, *O. viridiflora*, *O. Wentiana*, *O. Wilcoxii*; *Pereskia colombiana*, *P. Conzattii*, *P. Moorei*, *P. Zehntneri*; *Pterocactus Fischeri*, *P. Hickenii*, *P. pumilus*; *Tacinga funalis*; one new name, *Opuntia pestifer*; three new combinations, *Grusonia Bradtiana*, *Maihuea patagonica*, and *Pterocactus tuberosus*. [See Bot. Absts. 3, Entry 1824].—J. N. Rose.

2195. DAMMER, U. *Chelyocarpus* Dammer nov. gen. Notizbl. Bot. Gart. Berlin 7: 44-51. 1920.—*Chelyocarpus*, nov. gen., includes one new species of palm from Brazil, namely, *C. Ulei*.—H. A. Gleason.

2196. FERNALD, M. L. *The American Ammophila*. *Rhodora* 22: 70-71. 1920.—The common Sand Reed, Marram, or Beach Grass, of the coastal sand dunes from the Straits of Belle Isle to North Carolina, and of the St. Lawrence system inland to Lake Superior, which has been universally identified with *Ammophila arenaria* of the western and southern coasts of Europe, is a distinct species, here published as *Ammophila breviligulata*. The distinguishing characters of the two species and the geographic distribution of the latter are discussed.—James P. Poole.

2197. FERNALD, M. L. *Juncus Gerardi* Loisel., var. *pedicellatus*. *Rhodora* 22: 76. 1920.—A new variety, differing from the typical *J. Gerardi* in its large flowers and elongated pedicels, collected on the coast from Maine to Rhode Island.—James P. Poole.

2198. FERNALD, M. L. A new *Digitaria* from New Hampshire. *Rhodora* 22: 101-104. 1920.—The plant discovered by the late F. W. BATCHELDER in northeastern Hillsboro County, New Hampshire, in 1901, and distributed to various herbaria by the collector as *Syntherisma filiforme* (L.) Nash, is quite distinct from the latter and is published as *Digitaria laeviglumis* n. sp. The author gives a list of transfers found necessary in organizing the North American material of *Digitaria* in the Gray Herbarium, noting the synonymy involved in each case.—James P. Poole.

2199. FERNALD, M. L. *Oxalis montana*. *Rhodora* 22: 143-144. 1920.—The author previously pointed out (*Rhodora* 20: 76-78. 1918) several characters by which the northern wood sorrel of eastern America differs from the Old World *O. acetosella* L., and took up for the American plant the name *O. americana* Bigelow (1824). He now finds that this plant had been properly named by RAFINESQUE in 1818 and therefore should be known as *O. montana* Raf. The following new combination is made: *O. montana* Raf. forma *rhodantha* (*O. americana* Bigelow forma *rhodantha* Fernald).—James P. Poole.

2200. FERNALD, M. L. *Pyrola rotundifolia* and *P. americana*. *Rhodora* 22: 121-123. 1920.—In a former paper (*Rhodora* 4: 201. 1904) the author pointed out the distinctions between the northern Eurasian *Pyrola rotundifolia* L. and the Alleghenian *P. americana* Sweet. More recent material from Newfoundland bridges somewhat the gap between the two plants. These Newfoundland plants seem to be inseparable from the Eurasian *P. rotundifolia* L., var. *arenaria* Mert. & Koch, the latter differing in no morphological character from the continental and more southern *P. americana* Sweet. The Newfoundland plant is now published as *P. rotundifolia* L. var. *arenaria* Mert. & Koch, and the continental form, distributed from Nova Scotia westward to Minnesota and South Dakota and southward to Georgia, becomes *P. rotundifolia* L. var. *americana* (Sweet) n. comb.—James P. Poole.

2201. GAGNEPAIN, F. *Aetheocephalus*, nouveau genre de Composées. [*Aetheocephalus*, a new genus of the Compositae.] Bull. Mus. Hist. Nat. [Paris] 26: 172-173. 1920.—*A. Thorelii* is published as the representative of a new genus previously recognized by THOREL in manuscript only. This plant of southeastern Asia is placed in the tribe *Helianthoideae* and subtribe *Coreopsideae*.—E. B. Payson.

2202. GAMBLE, J. S. The flora of Madras III. Bull. Misc. Inf. Kew 1920: 49-57. 1920.—A collection of miscellaneous notes on various species included in the 3rd part of the "Flora of Madras" intended to supplement that work. The following new combinations are made: *Syzygium Fergusoni* (*Eugenia Fergusoni* Trim.), *S. olivifolium* (*Eugenia olivifolia* Duthie).—E. B. Payson.

2203. GODFERY, M. J. *Cephalanthera* Richard or *Epipactis* Crantz? Jour. Botany 58: 69-74. 1920.—The author takes exception to R. VON WETTSTEIN's treatment of *Cephalanthera*, *Epipactis*, and *Limodorum* in which these three genera are united. Wettstein criticised the work of RICHARD, REICHENBACH, and BENTHAM and HOOKER, attempting to show that the characters used by them were overdrawn, and in many cases were not of a basic nature. Godfery holds that Wettstein himself was in error, and that these characters proposed by the older authors are sufficient to warrant the retention of the three genera. The characters under discussion relate to the presence or absence of a rostellum, single or tetrad pollen, shape of the stigma, shape of the anther, and degree of divergence of the perianth. One species, *C. cucullata* which Wettstein considers transitional Godfery believes to be a probable bigeneric hybrid of *Cephalanthera* and *Limodorum*. The author suspects that Wettstein was prejudiced by his bias against the probability of the occurrence of bigeneric hybrids.—K. M. Wiegand.

2204. GODFERY, M. J. Orchids of Hants and Dorset. (Abstract.) Rept. British Assoc. Adv. Sci. 1919: 331. 1920.

2205. GUILLAUMIN, A. Contribution à la flore de la Nouvelle-Calédonie. [Contribution to the flora of New Caledonia.] Bull. Mus. Hist. Nat. [Paris] 26: 174-179. 1920.—In continuation of his series of similar papers on the flora of New Caledonia the author gives a list of plants collected by M. and MME. LERAT. The following new names and species new to science are proposed: *Oxalis neo-caledonica*, *Melicope LeRatii*, *M. Balansae* (*Evodia Balansae* Baill. mss.), *M. leptococca* (*Evodia leptococca* Baill. mss.), *M. Veillardii* Baill. mss. (*Evodia Veillardii* Baill.), *M. lasioneura* Baill. mss. (*Evodia lasioneura* Baill.), *Evodia pseudo-obtusifolia*, *Polyosma LeRatii*, *P. Pancheriana* Baill. var. *subintegrifolia*, *Myrtus supra axillaris*, *Litsea uniflora*, and *L. triflora*.—E. B. Payson.

2206. HARMS, H. Drei neue *Mucuna*-Arten aus Papuasien. [Three new species of *Mucuna* from Papuasias.] Notizbl. Bot. Gart. Berlin 7: 28-30. 1920.—*Mucuna amblyodon*, *M. Peekelii*, and *M. Schlechteri* are described as new.—E. B. Payson.

2207. HARMS, H. Eine neue Gattung der Leguminosae-Papilionatae aus Papuasien. [A new genus of Papilionaceae from Papuasias.] Notizbl. Bot. Gart. Berlin 7: 26-27. 1920. The genus *Peekelia* is erected to include *Phaseolus papuanus* Pulle.—H. A. Gleason.

2208. HITCHCOCK, A. S., AND AGNES CHASE. Revisions of North American grasses. Contrib. U. S. Nation. Herb. 22: 1-77. Pl. 1-24, fig. 1-20. 1920.—Under this title are published revisions of four genera of grasses of the tribe *Paniccae*. The first, by A. S. Hitchcock, treats of the North American species of *Ichnanthus*. Ten species are described, all but one illustrated by photographs of specimens. The second, by the same author, is a revision of the fifteen known species of *Lasiacis*, all American, each of which is represented by a photograph of a specimen. One new species, *Lasiacis leptostachya* Hitchc. from Nicaragua, is described. The third paper, by Agnes Chase, discusses the North American species of *Brachiaria*, a genus which, unlike most of the *Paniccae*, belongs primarily to the Old World. Six species are described, each illustrated by figures showing part of the inflorescence, anterior and dorsal views of a spikelet, and the fruit. One new species, *Brachiaria ophryodes* Chase, from Mexico, is described, and the following new combinations occur; *Brachiaria Gilesii* (Benth.) Chase, *B. miliiformis* (Presl) Chase, and *B. ciliatissima* (Buckl.) Chase, only the last referring to a North American species. The fourth paper, by Mrs. Chase, treats of the North American species of *Cenchrus*, 13 species being described and illustrated by figures of the burs and of the spikelets. The name *Cenchrus carolinianus* Walt., which has figured in the literature for some years, is regarded as unidentifiable.—S. F. Blake.

2209. JOHANSSON, K. Nya *Hieracia* silvaticiformia från Sverges låglad. [New *Hieracia* silvaticiformia from the lowlands of Sweden.] [Swedish.] Bot. Notiser [Lund] 1920: 65-100. 1920.—The article contains descriptions of 30 new species, and varieties, or new combinations, named by the author, or by G. SAMUELSSON, or by both conjointly.—P. A. Rydberg.

2210. KNUTH, R. Oxalidaceae americanae novae. [New American Oxalidaceae.] Notizbl. Bot. Gart. Berlin 7: 289-318. 1919.—Under the sections to which they belong are described and listed the following new species, new varieties, new combinations, and new names: *Oxalis mairaryensis*, *O. nigricans* Pohl var. *diversifolia*, *O. glaucifolia*, *O. ramulosa*, *O. chanduyensis*, *O. coarctata*, *O. erosa*, *O. Lindheimeri* Torr., *O. yucatensis* (*Lotoxalis yucatensis* Rose), *O. glabrata* (*O. Neaei* var. *glabrata* Baker), *O. Hilaireana*, *O. pulchriflora*, *O. Progelii* (*O. comosa* Prog.), *O. maracayensis*, *O. tenuicalyculata*, *O. tenuicalyculata* var. *glabra*, *O. tenuicalyculata* var. *hirsuta*, *O. anthyllidifolia*, *O. anthyllidifolia* var. *acuta*, *O. anthyllidifolia* var. *obtusata*, *O. Hassleri*, *O. alta*, *O. ovalis* Ruiz, *O. piahyensis*, *O. candicans*, *O. hirsutissima* Mart. & Zucc. var. *rotundata*, *O. hirsutissima* var. *oblonga*, *O. hirsutissima* var. *gracilior*, *O. cordifolia*, *O. tristis*, *O. renifolia*, *O. diamantinae*, *O. robusta* (*Monoxalis robusta* Rose), *O. fritillariiformis*, *O. fruticosa*, *O. novae caledoniae* Knuth & Schlechter, *O. pubescens* HBK. var. *glandulosa*, *O. Saulierei*, *O. subintegra*, *O. tabaconasensis*, *O. Niederleinii*, *O. texana* (*Xanthoxalis texana* Small), *O. corniculata* L. var. *sericea*, *O. corniculata* var. *macrophylla*, *O. corniculata* var. *serpens*, *O. interior* (*Xanthoxalis interior* Small), *O. coloreae* (*Xanthoxalis coloreae*

Small), *O. californica* (*Xanthoxalis californica* Abrams), *O. uruguayensis* (*Acetosella amara* var. *glandulosa*), *O. petrophila*, *O. parvifolia* DC. var. *pluriflora*, *O. cordobensis*, *O. cordobensis* var. *typica*, *O. cordobensis* var. *humilior*, *O. famatinae*, *O. contracta*, *O. patula*, *O. inflata*, *O. bartolomensis*, *O. cuzcensis*, *O. chosicensis*, *O. fernandensis*, *O. Besseri*, *O. chilensis*, *O. geranioides*, *O. parva*, *O. Hauthalii*, *O. juninensis*, *O. Güssfeldtii*, *O. riojana* Hieron., *O. bulbifera*, *O. solarensis*, *O. mercedensis*, *O. sorianensis*, *O. subviscosa*, *O. Schickendantzii*, *O. Taquetii*, *O. Smalliana* (*O. macra* Small), *O. hupehensis*, *O. Cunninghamii*, *O. frigida*, *O. pudica*, *O. elegantula*, *O. Lindneri*, *O. tubaensis*, *O. bulbifera*, *O. yacutulensis*, *O. atroglandulosa*, *O. Niederleiniana* Hieron., *O. pinguiculacea*, *O. hyalinorhiza* Poepp., *O. fluminensis*, *O. bermejensis*, *O. carminea*, *O. argentina* (*O. bipartita* var. *alpina* Griseb.), *O. catamarcensis*, *O. multipes*, *O. pearsallensis*, *O. ramonensis*, *O. Ehrenbergii*, *O. foliata*, *O. morelosensis* (*Ionoxalis bipartita* Rose), *O. intermedia* (*O. intermedia* A. Rich.), *O. stipulata* Rose (*Ionoxalis stipitata* Rose), *O. amplifolia* (*O. divergens* var. *amplifolia* Trel.), *O. angulata* (*Ionoxalis angulata* Small), *O. calcarea* (*Ionoxalis calcarea* Small), *O. immaculata* (*Ionoxalis immaculata* Small), *O. macrocarpa* (*Ionoxalis macrocarpa* Small), *O. leonis* (*Ionoxalis madrensis* Rose), *O. Metcalfei* (*Ionoxalis Metcalfei* Small), *O. neo-mexicana* (*Ionoxalis monticola* Small), *O. mucronata* (*Ionoxalis mucronata* Rose), *O. obliqua* (*Ionoxalis obliqua* Rose), *O. quadriglandula* (*Ionoxalis quadriglandula* Rose), *O. hidalgensis* (*Ionoxalis rupestris* Small), *O. Seatonii* (*Ionoxalis Seatonii* Rose); *O. trinervia* (*Ionoxalis trinervia* Rose), *O. vallicola* (*Ionoxalis vallicola* Rose), *O. alpina* Rose (*Ionoxalis alpina* Rose), *O. tepicensis* (*Ionoxalis compacta* Rose), *O. gregaria* Rose (*Ionoxalis gregaria* Rose), *O. primavera* (*Ionoxalis primavera* Rose), *O. Pringlei* Rose (*Ionoxalis Pringlei* Rose), *O. stolonifera* (*Ionoxalis stolonifera* Rose), *O. tenuiloba* (*Ionoxalis tenuiloba* Rose), *O. crassiscaposa*, *O. cobanensis*, *O. pseudo-tetraphylla*, *O. tlalpamensis*, *O. caerulea* (*Ionoxalis caerulea* Small), *O. Hayi* (*Ionoxalis divaricata* Small), *O. lanceolata* (*Ionoxalis lanceolata* Small), *O. macilenta* (*Ionoxalis macilenta* Small), *O. magnifica* (*Ionoxalis magnifica* Rose), *O. multiceps* (*Ionoxalis multiceps* Small), *O. Nelsonii* (*Ionoxalis Nelsonii* Small), *O. oaxacana* (*Ionoxalis oaxacana* Rose), *O. Painteri* (*Ionoxalis Painteri* Rose), *O. Rosei* (*Ionoxalis Rosei* Small), *O. scopulorum* (*Ionoxalis scopulorum* Rose), *O. tenuissima* (*Ionoxalis tenuissima* Rose), *O. tridentalis* (*Ionoxalis tridentalis* Small), *O. trineuris* (*Ionoxalis trineuris* Small), *O. confusa* (*Ionoxalis confusa* Rose), *O. Conzattiana* (*Ionoxalis Conzattiana* Rose), *O. cuernavacana* (*Ionoxalis cuernavacana* Rose), *O. furcata* Rose (*Ionoxalis furcata* Rose), *O. Gonzalesii* (*Ionoxalis Gonzalesii* Rose), *O. Grayi* (*Ionoxalis Grayi* Rose), *O. jaliscana* Rose (*Ionoxalis jaliscana* Rose), *O. zacatecasensis* (*Ionoxalis occidentalis* Rose), *Biophytum somnians* (*Oxalis somnians* Mart. & Zucc.), *B. lindsaeifolium* (*Oxalis lindsaeifolia* Hook.), *B. dormiens* (*Oxalis dormiens* Mart. & Zucc.), *B. columbianum*, *B. antioquiense*, *B. castiquiariense* and *B. Passargei*.—H. A. Gleason.

2211. KRÄNZLIN, F. *Orchidaceae Kalbreyerianae* I. Notizbl. Bot. Gart. Berlin 7: 412-451. 1920.—The following new species of orchids are described from the collections of KALBREYER in Colombia: *Microstylis longissima*, *M. Kalbreyeriana*, *Chondrorhyncha macronyx*, *Ornithidium strictissimum*, *O. heterobulbon*, *O. olivaceum*, *Camaridium luteo-brunneum*, *Maxillaria gymnochila*, *M. laracina*, *M. diamantensis*, *M. convencionis*, *M. erubescens*, *M. podochila*, *M. antioquiiana*, *M. amblyantha*, *M. Mathewsii*, *Ponera caricalensis*, *Rodriguezia antioquiiana*, *Lycaste farinosa*, *Eriopsis Mesae*, *Batemaniana antioquiiana*, *Zygopetalum Kalbreyerianum*, *Warrea medellinensis*, *Trichopilia concepcionis*, *Bracthia brevis*, *B. minutiflora*, *Mormodes convolutum*, *Rodriguezia cuentillensis*, *Houlletia Kalbreyeriana*, *Jonopsis zebrina*, *Epidendrum polystachyoides*, *E. microdendron*, *E. subtorquatum*, *E. Sierrae Peladae*, *E. magnibracteum*, *E. latibracteum*, *E. bucararicense*, *E. filamentosum*, *E. stenopetaloides*, *E. kalloneuron*, *E. festucoides*, *Diothonea hemiscleroides*, *Chloraea sobralioides*, *Sobralia micrantha*, *Bletia candida*, and *Elleanthus longibracteatus*.—H. A. Gleason.

2212. KRÄNZLIN, F. *Zwei neue und eine kritische Orchidaceae*. [Two new and one critical species of orchids.] Notizbl. Bot. Gart. Berlin 7: 319-322. 1919.—Author discusses *Vanilla odorata* Presl and describes *Vanilla Preussii* n. sp. from Guatemala, and *Dikylkostigma* gen. nov. with one species, *D. Preussii*, from Venezuela.—H. A. Gleason.

2213. KRAUSE, K. Ueber die Gattungen *Camptopus* Hook. f. und *Megalopus* K. Sch. [The genera *Camptopus* and *Megalopus*.] Notizbl. Bot. Gart. Berlin 7: 36-43. 1920.—The older name *Camptopus* has priority for this group of four African Rubiaceous species, and evidence is presented for continuing their generic separation from *Cephaelis*. An analytical key is given and two new species described.—H. A. Gleason.

2214. LACAITA, C. C. The home of *Inula Helenium*. Jour. Botany 58: 21-22. 1920.—This plant has been cultivated from time immemorial in various parts of Europe. LINNAEUS in "Species Plantarum" mentions only England and Belgium as its habitat. BECK VON MANNAGETTA has asserted that the plant is native in middle Asia and not in Europe. The author takes exception to this, and cites cases in Greece, Macedonia and Italy where it must be native. TROTTER and ROMANO, from their experience in Italy, are cited as also taking exception to Beck's statement.—K. M. Wiegand.

2215. LECOMTE, HENRI. Deux espèces nouvelles du genre *Crateranthus* (Lecythidacées). [Two new species of the genus *Crateranthus* (Lecythidaceae).] Bull. Mus. Hist. Nat. [Paris] 26: 68-71. 1920.—Two species of *Crateranthus*, *C. Le Testui* and *C. congolensis*, are described as new to science and are contrasted by means of a key with the single species previously known.—E. B. Payson.

2216. LESTER-GARLAND, L. V. The botany of the Moroccan Middle Atlas. Jour. Botany 58: 97-101. 1920.—A list is given of the plants collected by CAPTAIN HUBERT LYNES during the summer of 1919. These plants all came from the middle zone of the range between 4000 and 6000 feet altitude. In the list they are divided into four groups: (1) Those reaching middle or north Europe; (2) widespread Mediterranean species; (3) west Mediterranean species; and (4) species endemic in Morocco or the Atlas. The relation of the Atlas flora to that of the hill districts of Central Europe is noted. The principal literature on the flora of the Atlas Mts. is listed. Special notes are given on *Potentilla hispanica* Zimm., *Cytisus Battandieri* R. Maire, *Erythraea major* Hoffm. & Link, and *Vernonia* ? *rosea* Desf.—K. M. Wiegand.

2217. LOESENER, T. Über eine neue *Stromanthe*-Art. [A new species of *Stromanthe*.] Notizbl. Bot. Gart. Berlin 7: 410, 411. 1920.—*Stromanthe humilis* Loes., from tropical America.—H. A. Gleason.

2218. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. V, Part 1. 1-25, pl. 168-171. William Applegate Gullick: Sydney, June, 1920.—The present part contains descriptions, notes, and illustrations of the following species and varieties: *Eucalyptus latifolia* F. v. M., *E. Foelscheana* F. v. M., *E. Abergiana* F. v. M., *E. pachyphylla* F. v. M., *E. pachyphylla* F. v. M., var. *sessilis* var. nov., *E. pyriformis* Turcz. var. *Kingsmilli* Maiden, *E. Oldfieldii* F. v. M., and *E. Drummondii* Benth. Ibid. Part 2. 27-70, pl. 172-175. 1920.—This part continues the revision with a similar treatment of the following species: *Eucalyptus exinea* Schauer, *E. peltata* Benth., *E. Watsoniana* F. v. M., *E. trachyphloia* F. v. M., *E. hybrida* Maiden, *E. Kruseana* F. v. M., *E. Dawsoni* R. T. Baker, *E. polyanthemus* Schauer, *E. Baueriana* Schauer, *E. conica* Deane & Maiden, and *E. concolor* Schauer.—J. M. Greenman.

2219. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Part 3. 77-121, pl. 236-239, 11 photographic reproductions. William Applegate Gullick: Sydney. March, 1920.—Five species are herein discussed, namely, *Brachychiton populneum* R. Br., *Eucalyptus rubida* Deane & Maiden, *Acacia Oswaldi* F. v. M., *A. neriifolia* A. Cunn., and *Harpullia pendula* Planch. Since *Eucalyptus rubida* is the main source of the Australian manna the author presents a general discussion on manna in an appendix. Ibid. Part 4. 123-191, pl. 240-243, 20 photographic illustrations. William Appleton Gullick: Sydney. 1920.—The present part contains descriptions, detailed notes and illustrations of the following species: *Pittosporum undulatum* Vent., *Eucalyptus viminalis* Labill., *E. Dalrympleana* Maiden n. sp., *Acacia stenophylla* A. Cunn., *A. coriacea* DC., *Geijera salicifolia* Schott, and *G. parviflora* Lindl. An appendix is added in which the author gives a discussion of "Phenology: a form of nature study with very practical applications."—J. M. Greenman.

2220. MILDBRAED, J. *Paraphyadanth* Mildbr. nov. gen. Flacourt. Ein interessanter Fall von "Rhizanthie" aus Kamerun. [Paraphyadanth die Mildbr., a new genus of Flacourtiaceae. An interesting case of "rhizanthie" from Kamerun.] Notizbl. Bot. Gart. Berlin 7: 399-405. Fig. A-O. 1920.—The new genus *Paraphyadanth*, with two species and one variety, produces flagelliform runners from the base of the trunk which extend to a distance of 10 meters or more along the surface of the ground, bear scale-like leaves, and produce the flowers either directly or at the summit of erect scaly branches. The vegetative portion of the plant is a small tree, up to 9 m. high. The genus is closely related to *Oncoba* and *Xylothea*. The following are the new species and variety described: *P. flagelliflora*, *P. flagelliflora* var. *hydrophila*, and *P. coriacea*.—H. A. Gleason.

2221. MOORE, SPENCER LE M. *Alabastra diversa*.—Part XXXII. Jour. Botany 58: 74-80. 1920 (cont. from Jour. Bot. 57: 91. 1919).—3. *Plantae Rogersianae*.—V. Under the Leguminosae thirteen species, subspecies and varieties are treated, the following being new: *Crotalaria cataractarum* Baker fil., South Rhodesia; *C. acervata* Bak. fil., Belg. Congo; *C. macrotropis* Bak. fil., Belg. Congo; *C. rigidula* Bak. fil., North Transvaal; *C. homalocarpa* Bak. fil., S. Rhodesia; *C. longistyla* Bak. fil., S. Rhodesia; *C. Harmsiana* Taub. var. *congoensis* Bak. fil., Belg. Congo; *Indigofera gonioides* Hochst. var. *rhodesica* Bak. fil., S. Rhodesia; *I. dimidiata* Vog. var. *laxior* Bak. fil., Transvaal; and *I. Burkeana* Benth. form. All the new species of *Crotalaria* belong to the section *Eucrotalaria*. The Leguminosae were elaborated by EDMUND BAKER. Under the Compositae four species are treated of which the following are proposed as new: *Stoebe Mossii*, Cape Colony; *S. affinis*, Cape Colony; *Metalsia Rogersii*, South Africa. Under the Convolvulaceae notes are given on *Merremia kentrocaulos* Rendle var. *pinnatifida* N. E. Br. In the Solanaceae, *Solanum Rogersii* is described as new. 4. *Phyllanthi ex Rhodesia species nova*. *Phyllanthus Eylesii* is proposed as new. 5. *Acanthaceae Papuanae a cl H. O. Forbes lectae*. Nine species are listed and the n. comb. *Graptophyllum Gilligani* (= *Justicia Gilligani* Bail.) is made.—K. M. Wiegand.

2222. OSTERHOUT, GEO. E. A new *Oreocarya* from Colorado. Bull. Torrey Bot. Club 47: 211. 1920.—*Oreocarya procera* from Glenwood Springs, Colorado, is described as a new species.—P. A. Munz.

2223. PENNELL, FRANCIS W. Soil preferences of Scrophulariaceae. Torrey 20: 10-11. 1920.—Instead of the expression "potassic soil," used by the author in his published studies of the Scrophulariaceae, "non-calcareous and non-magnesium soil" should be substituted. The chemical composition of soils and its relation to plant-distribution demand the attention of field-botanists.—J. C. Nelson.

2224. PILGER, R. *Gramineae austro-americanae imprimis Weberbauerianae*. V. Bot. Jahrb. 56 (Beibl. no. 123): 23-30. 1920 (cont. from Bot. Jahrb. 42: 50-72. 1906).—Report on grasses collected by Dr. A. WEBERBAUER in Peru, Ecuador, Bolivia, Argentina, Brazil, etc. The following species, varieties and names are proposed as new: *Stipa depauperata*, and vars. *glabrata* and *humilis*, *S. Hans-Meyeri*, *S. Hieronymusii*, *S. pachypus*, *Oryzopsis rigidiseta*, *O. Neesii*, (*Piptatherum obtusum* Nees), *Piptochaetium laeve* (*Piptatherum laeve* Nees), *Sporobolus mirabilis*, *Eragrostis carazensis*, *Dissanthelium minimum*, *Poa gymnantha*, *Arundinaria simpliciuscula*, *Chusquea sandiensis* (*C. ramosissima* Pilger), and *C. huantensis*.—K. M. Wiegand.

2225. RADLKOFER, L. Gesamtübersicht über die Sapindaceen Papuasien. [Survey of the Sapindaceae of Papuasias.] Under the general heading: C. LAUTERBACH. Beiträge zur Flora von Papuasien. VII. Bot. Jahrb. 56: 251-316. 4 fig. 1920.—The limits of Papuasias are outlined, and it is noted that of the 14 tribes in the Sapindaceae only three are not represented,—Sapindeae, Koelreuterieae, and Cossignieae. Tribes Paullinieae and Thouinieae are mainly American, while Tribe Aphanieae is almost entirely Asian and Papuasian. The range of the other tribes is given, together with the size and general distribution of the noteworthy genera in each. The total number of genera represented is 26. Sixteen of these

are of oceanic and 9 of Asiatic distribution. The discussion of the geographical distribution is very extended. A special discussion of the genus *Majidea* Kirk is appended. Keys are given to the genera, and under each genus to the species. Nomenclatorial references, synonymy, and notes on distribution and structure are given under the species. The following new forms, species, and combinations are proposed: *Aphania dictyophylla* (*Cupaniopsis dictyophylla* Radlk.), *Lepisanthes membranifolia* (*Erioglossum membranifolia* Radlk.), *Guioa subsericea*, *G. dasyantha*, *G. pauciflora*, *Cupaniopsis grosseserrata*, *G. brachythyrso*, *G. multidentata*, *C. oxypetala*, *C. atrotheca*, *C. gigantophylla*, *C. flaccida*, *Rhysotoechia elongata*, *Dictyoneura subhirsuta*, *D. microcarpa*, *Euphorianthus pallidus*, *Sarcopteryx rigida*, *Jagera serrata* forma *genuina* and forma *fulvinervis*, *J. macrophylla*, *Arytera densiflora*, *A. sordida*, *A. xanthoneura*, *Mischocarpus retusus*, *M. largifolius*, *Harpullia reticulata*, *H. largifolia*, *H. obscura*, and *H. petiolaris*.—K. M. Wiegand.

2226. REHDER, ALFRED. The American and Asiatic species of *Sassafras*. Jour. Arnold Arboretum 1: 242-245. 1920.—The taxonomic value of some of the characters used in the separation of genera in Lauraceae is discussed and a revised generic description of *Sassafras* given to include the two Asiatic species. *Sassafras randaiense* (*Lindera randaiensis* Hayata) appears as a new combination.—Alfred Rehder.

2227. REHDER, ALFRED. New species, varieties and combinations from the herbarium and collections of the Arnold Arboretum. Jour. Arnold Arboretum 1: 254-263. 1920.—The present continuation of this paper deals chiefly with Rosaceae and a few Saxifragaceae and Hamamelidaceae. Besides some new horticultural forms the following new species, new varieties, and new combinations appear: *Ribes Ruizii*, *Parrotiopsis Jacquemontiana* (Decne.), *Hamamelis vernalis* f. *tomentella*, *Physocarpus australis* (Rydb.), *P. stellatus* (Rydb.), *Neillia longeracemosa* var. *lobata*, *N. sparsiflora*, *Spiraea prunifolia* var. *hupehensis* (Rehd.), *S. Schochiana* and *S. Teniana*, both from China, *S. virginiana* var. *serrulata*, *Holodiscus franciscanus* (Rydb.), *Pyracantha discolor*, *P. Koidzumii* (Hayata), *Crataegomespilus Gillotii* (G. Beck), and *Sorbus Harrowwiana* (Balfour).—Alfred Rehder.

2228. RIDLEY, H. N. New and rare species of Malayan plants. Jour. Straits Branch Roy. Asiatic Soc. 82: 167-204. 1920.—An account of some novelties collected of recent years together with various corrections and emendations of the Malayan flora based on an examination of types at Kew and the British Museum. Seventy-six new species are described and 3 new genera, the latter being *Peniculifera* (Sterculiaceae), *Leptonychiopsis* (Sterculiaceae) and *Napeodendron* (Sapindaceae).—T. F. Chipp.

2229. ROCK, JOSEPH F. The leguminous plants of Hawaii. Experiment Station of the Hawaiian Sugar Planters' Association. Roy. 8vo, 234 p., 93 pl. Honolulu, July, 1920.—The 200 species included in this paper belong to 71 genera and are either native to the islands, have become well established there, or give promise of becoming permanent inhabitants. The percentage of indigenous species is exceedingly small. Keys to the genera and species are given as well as specific descriptions, synonyms, and notes regarding economic importance and local occurrence. The following new varieties are described and new combinations made: *Erythrina fusca* Lour. var. *inermis*, *Mucuna pachylobia* (*Stizolobium pachylobium* Piper & Tracy), *Dioclea altissima* (*Dolichos altissimus* Velloso), *Vigna sandwicensis* A. Gray var. *heterophylla*.—E. B. Payson.

2230. RYDBERG, P. A. Henry and Flood's the Douglas fir. [Rev. of: HENRY, AUGUSTINE, and MARGARET G. FLOOD. The Douglas firs: a botanical and silvicultural study of the various species of *Pseudotsuga*. Proc. Roy. Irish Acad. B. 35: 67-92. Pl. 12-14. May, 1920. See Bot. Absts. 4, Entry 1544.] Torrey 20: 102-104. 1920.—Three species and one variety of *Pseudotsuga* native to North America are admitted, viz: *P. Douglasii* Carrière from the Pacific Coast region and the var. *caesia* Schwerin from the northern Rocky Mountains; *P. glauca* Mayr. from the Rocky Mountains; and *P. macrocarpa* Mayr. from Southern California. The reviewer considers the var. *caesia* as more related to *P. glauca* than to *P.*

Douglasii, and probably to be rather regarded as a distinct species. Four species native to China and Japan are also described. A comparison is made as to difference in odor, minute anatomy of the leaves, and composition of the oil distilled from the leaves.—*J. C. Nelson*.

2231. RYDBERG, PER AXEL. Notes on Rosaceae—XII. Bull. Torrey Bot. Club 47: 45-67. 1920.—A discussion is given of the 33 species of roses of northeastern North America, with key to groups and with notes on each species. These notes supplement the material given by the same author in the "North American Flora." Nineteen hybrids are also reported.—*P. A. Munz*.

2232. SARGENT, C. S. Notes on North American trees. VI. Jour. Arnold Arboretum 1: 245-254. 1920.—*Hamamelis macrophylla* Pursh is taken up as a distinct species and the following new species of *Crataegus* described or new names proposed, and some reduced to varietal rank: *Crataegus montivaga*, *C. Cocksii*, *C. meridionalis*, *C. noelensis*, *C. rufula*, *C. drymophila*, *C. aestivalis* var. *maloides*, *C. aestivalis* var. *cerasoides*, *C. aestivalis* var. *cerasoides* f. *luculenta*, *C. Holmesiana* var. *tardipes*, *C. pedicellata* var. *gloriosa*.—*Alfred Rehder*.

2233. SCHLECHTER, R. Die Columelliaceae. Notizbl. Bot. Gart. Berlin 7: 8-14. 1920.—The family is best placed near the Gesneriaceae. An analytical key and descriptions are given of the 6 species of *Columellia*, and a new species, *C. Weberbaueri* Schltr., is described from Peru.—*H. A. Gleason*.

2234. SCHLECHTER, R. Tetradema Schltr., ein neues Genus der Gesneriaceen. [A new genus of Gesneriaceae.] Notizbl. Bot. Gart. Berlin 7: 15-18. 1920.—The genus includes four species of the Philippines, Borneo, Java, and Sumatra, hitherto placed in other related genera. The following new combinations are made: *Tetradema rubrum* (*Trichosporum rubrum* Merr.), *T. tuberculatum* (*Agalmyla tuberculata* Hook. f.), *T. asperifolium* (*Agalmyla asperifolia* Bl.), *T. praelongum* (*Dichrotrichum praelongum* Kränzl.).—*H. A. Gleason*.

2235. SCHLECHTER, R. Eine zweite Art der Gattung Androcorys Schltr. [A second species of Androcorys Schltr.] Notizbl. Bot. Gart. Berlin 7: 52, 53. 1920.—*Herminium gracile* King & Pantl. is transferred as *Androcorys gracilis* (King & Pantl.) Schltr.—*H. A. Gleason*.

2236. SCHLECHTER, R. Orchidaceae novae, in caldariis Horti Dahlemensis cultae. II. [New orchids cultivated in the warm-houses at Dahlem.] Notizbl. Bot. Gart. Berlin 7: 323-330. 1919.—New species are described as follows: *Cryptophoranthus similis*, *Stelis calotricha*, *Otomeria Dusenii*, *O. irrorata*, *Bulbophyllum dahlemense*, *B. paranaense*, *Promenaea acuminata*, *P. albescens*, *Capanemia paranaensis*, *Oncidium aberrans*, *Aerangis parvula*, *Angraecum elephantinum*.—*H. A. Gleason*.

2237. SCHMIDT, WILH. Dendrobium delicatum Bail. Orchis 14: 1-2. 1920.—*Dendrobium delicatum* Bail. occurs in nature on the rocky cliffs near Toowoomba, Queensland, in company with *D. Kingianum* and *D. speciosum* var. *Hillii*. It is believed that *D. delicatum* is a hybrid between these two.—*E. B. Payson*.

2238. SCHNEIDER, CAMILLO. Notes on American willows. VII. Jour. Arnold Arboretum 1: 147-171. 1920.—The present paper deals with the section Adenophyllae containing 8 and with the section Balsamiferae containing 2 species. As in the preceding papers of this series keys to the species are given and each species is discussed in detail. The following species, form and combination are new: *Salix orestera*, *S. Eastwoodiae* f. *callicoma*, *S. glaucophylloides* var. *glaucophylla* (Bebb).—*Alfred Rehder*.

2239. SCHNEIDER, CAMILLO. Notes on American willows. VIII. Jour. Arnold Arboretum. 1: 211-239. 1920.—This paper deals with the sections Chrysanthae (8 species), Candidae (1 species) and with *Salix Wolfii*. As in the preceding papers of this series keys to the species are given and each species is discussed in detail. The following varieties are new: *Salix Hookeriana* var. *tomentosa* and *S. alaxensis* var. *longistylis* (Rydb.).—*Alfred Rehder*.

2240. SMITH, J. J. *Orchidaceae novae malayenses IX*. [New orchids of the Malayan region.] Bull. Jard. Bot. Buitenzorg III, 2: 15-127. 1920.—The following new species are described: *Apostasia elliptica*, *A. platystylis*, *Corysanthes sumatrana*, *C. bancana*, *Didymoplexis Trichechus*, *Vanilla abundiflora*, *V. sumatrana*, *Vrydagzynea deliana*, *Coelogyne brachygyne*, *C. imbricans*, *Dendrochilum Gravenhorstii*, *D. polluciferum*, *D. rigidifolium*, *Liparis mentawaiensis*, *L. foetulenta*, *Podochilus bilabiatum*, *P. bancanus*, *Appendicula brevimentum*, *Agrostophyllum sumatranum* Schltr. & J. J. S. var. *borneense*, *A. confusum*, *Ceratostylis crassipetala*, *C. Jacobsonii*, *C. tricallifera*, *Phajus callosus* Lndl. var. *sumatranus*, *P. pauciflorus* Bl. var. *sumatranus*, *P. pauciflorus* var. *punctatus*, *P. corymbioides* Schltr., *P. labiatus*, *Eria taluensis*, *E. compressa* Bl. var. *sumatrana*, *E. Jenseniana*, *E. Nieuwenhuisii*, *E. oberoniiflora*, *E. bancana*, *E. mentawaiensis*, *E. rubifera*, *E. scotiifolia*, *Dendrobium flabelloides*, *D. denigratum*, *D. labangense*, *D. maculosum*, *D. forcipatum*, *D. xantholeucum* Rehb. f. var. *obtusilobum*, *D. steldiiiferum*, *D. dempoense*, *D. quinquecallosum*, *D. Ruttenii*, *D. Laurensii*, *D. taurulinum*, *D. Demmenii*, *D. croceocentrum*, *D. Maierae*, *D. cinereum*, *D. Groeneveldtii*, *D. grastidioides*, *D. fimbriolabium*, *D. septemcostulatum*, *D. tetrodon* Rehb. f. var. *Vanvuureni*, *Bulbophyllum javanicum* var. *sumatranum*, *B. rigidifolium*, *B. farinulentum*, *B. crepidiferum*, *B. fibrosum*, *B. dempoense*, *B. silapingense*, *B. lemniscatoides* Rolfe var. *exappendiculatum*, *B. Theunissenii*, *B. lumbriciforme*, *B. Groeneveldtii*, *B. osyriceroides*, *B. trichoglottis* Ridl. var. *sumatranum*, *B. elevatopunctatum*, *B. lepidum* var. *insigne*, *B. campanulatum* Rolfe var. *inconspicuum*, *B. viscidum*, *Sarcochilus bipennis*, *S. decipiens*, *Thrixspermum aurantiacum*, *T. sumatranum*, *T. longilobum*, *T. latisaccatum*, *T. flaccidum*, *Saccolabium longicaule*, *Adenoncos uniflora*, *Arachnis Vanmulleemii*, *Malleola baliensis*, *Robiquetia Hansenii*, *R. viridirosea*, *Pomatocalpa simalurensis*, *Microsaccus canaliculatus*.—J. J. Smith.

2241. STAFF, O. *Thellungia*, a new genus of Gramineae. Bull. Misc. Inf. Kew 1920: 96-99. Fig. 1-11. 1920.—This grass probably of Australian origin, was found in the vicinity of Solothurn, Switzerland, near a woollen mill. It is made the type of a new genus, *Thellungia*, related to *Sporobolus*. *T. advena* is its only known representative.—E. Mead Wilcox.

2242. STAFF, O. *Setaria* or *Chaetochloa*. Bull. Misc. Inf. Kew 1920: 124-127. 1920.—*Chaetochloa* was proposed by Scribner to replace the name *Setaria* for two reasons. *Setaria* was, according to him, first applied by Beauvois to a species of *Pennisetum* and furthermore at an earlier date was employed by Acharius to a genus of lichens. It is shown that Acharius used this name not as a generic one but to designate a tribe. It is further shown that the plant understood by Scribner to be the type of the genus is really a *Setaria* and not a *Pennisetum*. But this species is after all not the type of the genus. The type must be taken as *S. viridis*, which was first used by Beauvois as illustrating the genus *Setaria*. This species is also a true *Setaria*.—E. Mead Wilcox.

2243. ST. JOHN, HAROLD. The genus *Elodea* in New England. Rhodora 22: 17-29. 1920.—The writer gives a key to the New England species of the genus *Elodea* of Michaux, synonymous with the genus *Philotria* of Rafinesque and adopted by Rydberg. All of the material is put into four species, *E. canadensis* Michx., *E. occidentalis* (Pursh) St. John, *E. Nuttallii* (Planchon) St. John, and *E. Planchonii* Caspary. The synonymy and bibliography, list of illustrations, and distribution of each of these is given. The article also includes a discussion of the flower structure of *E. canadensis* and the history of its rapid spread in Europe and the British Isles; a description of pollination in *E. occidentalis*; and discussions as to the validity of other species proposed by various authors.—James P. Poole.

2244. ST. JOHN, HAROLD. *Trillium rectistamineum*, a valid species of the southeastern United States. Rhodora 22: 78-79. 1920.—*Trillium lanceolatum* Boykin var. *rectistamineum* Gates is raised to specific rank. The name as published is *Trillium rectistamineum* (Gates) comb. nov. A bibliography and description are given.—James P. Poole.

2245. ST. JOHN, HAROLD, AND DONALD WHITE. The genus *Galinsoga* in North America. Rhodora 22: 97-101. 1920.—A synopsis of the North American species of this genus as understood by the authors. The species are distinguished especially by differences in the pappus of the ray- and disc-flowers.—James P. Poole.

2246. TRAAEN, CARL. [Rev. of: ALMQUIST, S. *Sveriges Rosae*. (Swedish roses.) Stockholm, 1919.] Jour. Botany 58: 115-116. 1920.

2247. TURRILL, W. B. The Rev. H. F. Tozer and plants collected by him in the Nearer East. Bull. Misc. Inf. Kew 1920: 29-31. 1920.

2248. TURRILL, W. B. The genus *Rosmainus*. Bull. Misc. Inf. Kew 1920: 105-108. 4 fig. 1920.—In a brief revision of this genus 4 species are recognized and of *R. officinalis* L. several varieties and forms. The variety *R. officinalis* L. var. *genuina* is described as new.—E. Mead Wilcox.

2249. T [URRILL], W. B. *Carex riparia* var. *gracilis* in Britain. Bull. Misc. Inf. Kew 1920: 141-142. 1920.

2250. ULBRICH, E. Neue Arten der Gattung *Hibiscus* Sect. *Bombycella* DC. [New species of *Hibiscus* Sect. *Bombycella*.] Notizbl. Bot. Gart. Berlin 7: 19-25. 1920.—Nine species, chiefly from Africa, are described as new, as follows: *Hibiscus serratifolius*, *H. sulfuranthus*, *H. sumbawanus* Warburg & Ulbrich, *H. ahlensis*, *H. meidiensis*, *H. heterochlamys*, *H. flavifolius*, *H. gallaënsis*, and *H. chrysochaetus*.—H. A. Gleason.

2251. ULBRICH, E. Einige neue *Lupinus*-Arten aus den Anden von Peru. [Some new species of *Lupinus* from the Andes of Peru.] Notizbl. Bot. Gart. Berlin 7: 452-454. 1920.—Three new species are described as follows: *Lupinus matucanicus*, *L. pinguis*, and *L. misticola*.—H. A. Gleason.

2252. VAUPEL, F. Neue afrikanische Iridaceen. [New African Iridaceae.] Notizbl. Bot. Gart. Berlin 7: 31-35. 1920.—New species are described as follows: *Acidanthera divina*, *Antholyza pubescens*, *Gladiolus Boehmii*, *G. Bussei*, *G. Mildbraedii*, *G. validissimus*.—H. A. Gleason.

2253. WERNHAM, H. F. *Dewevrella congenesis* sp. nov. Jour. Botany 58: 80-81. 1920.—This genus of the Apocynaceae was founded as recently as 1907 by DE WILDEMAN, and the only known species is *D. cochlostema*. The present new species, the second in the genus, was collected by M. A. NANNAN in the same district, namely, Boyeka at the equator.—K. M. Wiegand.

2254. WERNHAM, H. F. Tropical American Rubiaceae.—XIII. Jour. Botany 58: 105-108. 1920.—The genus *Coupouï* is considered in this number. A historical account is given of the genus beginning with the original description by AUBLET in 1775. It has been very poorly understood owing to a lack of flowering material. The genus is here held to belong to the Rubiaceae though by earlier authors it was placed in the Apocynaceae and Myrtaceae. A key is given to the three known species, also synonymy and notes on distribution. *C. brasiliensis* is described as new.—K. M. Wiegand.

2255. WIEGAND, K. M. *Eupatorium purpureum* and its allies. Rhodora 22: 57-70. 1920.—By the examination of the material ordinarily recognized as *Eupatorium purpureum*, the writer has worked out a treatment for this section of the genus. Four species and one variety have been confused under the general name *E. purpureum* L., now separated as *E. verticillatum* Lamarek, *E. maculatum* L., *E. maculatum* var. *foliosum* (Fernald) comb. nov., *E. purpureum* L., and *E. falcatum* Michx. The facts and the history as to the synonymy and nomenclature of these species are given in considerable detail as well as a key for their identification.—James P. Poole.

2256. WILMOTT, A. J. *Erythraea scilloides* Chaubard. Jour. Botany 58: 23. 1920.—The author discusses the proper name for a plant found in Pembrokeshire, taking exception to the disposition of the plant made by DRUCE.—K. M. Wiegand.

2257. WOLLEY-DOD, A. H. On collecting roses. Jour. Botany 58: 23-24. 1920.—It is suggested that more attention be given to collecting roses in the reddened-fruit stage, as in that condition British roses, at least, are most satisfactorily identified.—K. M. Wiegand.

2258. WOLLEY-DOD, A. H. A revised arrangement of British roses. Jour. Botany 58: Suppl. 1-20. 1920.—The author discusses the present status of the rose question, stating that by the proper treatment of varieties a working classification can be arranged. The work of Déséglise is found to be very unsatisfactory, many of the forms having been based on single specimens. A tabular synopsis of the British roses is given consisting of five sections and many subsections, groups, secondary groups, and subgroups. The species under each are considered at length with synonymy and notes. Many varieties and some forms are recognized under most of the species.—K. M. Wiegand.

2259. ZIMMERMAN, WALTHER. Mitteilungen zur Orchiaceras-Gruppe aus Baden. [Contributions on the Orchiaceras group from Baden.] Mitteil. Badischen Landesver. Naturk. u. Naturschutz Freiburg im Breizgau N. S. 1: 21-31. 1919.—A study of hybrids occurring in nature between species of *Orchis* and *Aceras*. The following new hybrids are named and described with the probable parents indicated in parentheses: *Orchiaceras spuria* Cam. forma *Neumannii* (*Orchiaceras spuria* × *Aceras anthropophorum*), *O. macra* Cam. forma *rhenana* (*Orchis purpureus* × *Aceras anthropophorum*) and *O. macra* Cam. forma *freiburgensis* (*Orchis purpureus* × *Aceras anthropophorum* or *Orchiaceras macra* × *Orchis purpureus*?). The various hybrids and their parents are illustrated.—E. B. Payson.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

SAM F. TRELEASE, *Assistant Editor*

2260. ANONYMOUS. Something about artificial silk. Sci. Amer. Monthly 1: 516-517. 1920. [From American Silk Journal, April, 1920.]—Artificial silk is spun from a thick, viscous liquid, called viscose, which is prepared from wood. Article considers the present production and possible sources of future supply of this commercial product.—Chas. H. Otis.

2261. ANONYMOUS. Voices of trees. Brooklyn Bot. Gard. Rec. 9: 103-105. July, 1920.—Observations of Mr. JOHN GRIMSHAW WILKINSON, the blind botanist of Leeds, as given by Prof. W. H. BRAGG in lecture on "Sounds" at the Royal Institution. Reported in London Times, Jan. 8, 1920. During rain, the most silent tree is *Pinus sylvestris*, the noisiest are oaks.—C. S. Gager.

2262. DASEN, A. H. Elaboración a domicilio de vinagre de plátano. [Home vinegar making from plantains.] Rev. Agric. Com. y Trab. [Cuba] 3: 253-254. 1920.—Translated and slightly modified by A. BRAMBILA, from Bull. Agric. Soc. Trinidad and Tobago 20. Feb., 1920.—F. M. Blodgett.

2263. DURRELL, L. W. Tongs for handling disinfected seed. Phytopath. 9: 581-582. 1 fig. 1919.—A description of tongs for removing seed from test tubes.—J. G. Dickson.

2264. LAPICQUE ET BROCC-ROUSSEU. Les algues marines comme aliment de travail pour le cheval. [The marine algae as food for horses.] Compt. Rend. Acad. Sci. Paris 170: 1601-1603. 1920.

2265. PANTANELLI, E. Uso del cipollaccio per l'alimentazione e la produzione di alcool. [The use of *Muscari comosum* Mill. for food and for alcohol production.] Staz. Sper. Agrarie Ital. 53: 101-112. 1920.—The bulbs of *Muscari comosum* Mill. as well as of *Hyacinthus ciliatus* Cir. were found to be very nutritious and well adapted to alcoholic fermentation after a previous treatment with dilute acid, to hydrolyse the polysaccharides, and subsequent neutralization with calcium carbonate. The alcohol production of *Muscari* was found to be 10.5 per cent, while *Hyacinthus* yielded 8.4 per cent of the fresh bulb substance.—A. Bonazzi.

2266. PAVARINO, G. L., E G. CASTELLARI. *Il Falasco nell'industria della carta.* [The marsh vegetation and paper industry.] Staz. Sperim. Agrarie Ital. 53: 32-46. Pl. 1. 1920.—The vegetation of the marshy places in the province of Pisa (Italy) is known by the local name of *falasco*, and is made up of *Phragmites communis*, various species of *Carex*, various species of *Scirpus*, *Cyperus*, and *Typha*, together with *Schoenus mariscus*, *Calamagrostis epideios*, *Arundo donax*, several species of *Juncus*, *Sparganium ramosum*, *Glyceria aquatica*, and *Sagittaria angustifolia*. Some of the plants thus found are utilized in the manufacture of rope, mats, etc., but a great portion of them is allowed to decay. The present contribution considers the botanical, physical, microscopical, and chemical characters of the various plants and takes up also the question of bleaching with SO_2 and KMnO_4 . The results of the investigation may be summarized as follows: *Carex paludosa* yielded 43 per cent of cellulose, *Phragmites communis* 47.5, *Scirpus lacustris* 45.5, *Typha angustifolia* 44.0, and *Cyperus longus* 25.0 per cent. In most cases the fibers are long and regular and well adapted to paper manufacture.—A. Bonazzi.

2267. STOCKHAM, W. L. Some factors related to the quality of wheat and strength of flour. North Dakota Agric. Exp. Sta. Bull. 139. 69 p., 3 fig., 13 charts. 1920.—The smallest loaf volume is secured from soft white wheat, an increase in volume being noted for soft red winter, durum, hard red winter, and hard red spring, in order.—No correlation exists between bran color and baking quality of flour.—Low bacterial infection of berry was found to be associated with "brightness" of the sample.—In study of 28 pure line Ghirka wheats loaf volume increased with increase of protein content of flour up to 13.5 per cent and then decreased as protein content increased. Adding gluten to flour increased loaf volume materially. Lack of strength in low grade flours is not due usually to lack of gas but rather to inability of baking loaf to retain it. Amount of gas generated by loaf was usually correlated with amount of extractives present in flour. Adding aqueous extract from different flours increased loaf volume and decreased time required for loaf to rise. Crude fat secured from flour added to flour increased loaf volume. Other fats added decreased loaf volume.—No correlation was found between ratio of soluble to total protein in flour and volume of loaf produced therefrom.—Proteolytic activity of various grades of flour differed greatly. The greatest was found in straight flour from sprouted wheat and less from high grade flours. Flour from germ end showed much less expansion and more proteolytic activity than flour from blossom end. Milling results are given from germ and blossom end of kernels. Gluten added to wheat germs increased proteolytic activity. Proteolytic activity of ground wheat was greater than the corresponding flours made from such wheats and was greater in wheats injured by weathering and exposure.—In general, water absorption increased with an increase of protein content in flour. With increase in ash content in flour the ratio of water absorption in flour to protein content decreased. The relation of mineral constituents to gluten quality is discussed.—The effect of certain salts and acids in baking tests, mainly as affecting the colloidal action of gluten, is shown. Effect of acids and NaOH upon strength of flour and texture of loaf was injurious.—From a quantity of wheat kept in storage for 9 years, samples for milling were taken at intervals. An improvement in flour strength and loaf characters was noted for about one year but no appreciable deterioration was noted until after lapse of 7 years, but flour milled from the old wheat deteriorated markedly in strength after 4 months storage with decided falling off in loaf texture.—Studies were made upon the effect of oxidation upon enzyme activity with no decisive results.—An extended review of literature is given.—L. R. Waldron.

2268. STRAND, E. [Rev. of: THESING, C. *Biologische Streifzüge. Eine gemeinverständliche Einführung in die allgemeine Biologie.* (Biological excursions. A popular introduction to general biology.) 2nd edition. 364 p., 6 colored pl., 74 fig. Esslingen and München, 1908.] Arch. Naturgesch. Abt. A. 83: 172, 173. (1917) 1919.

2269. TUNISON, BURNELL R. Industrial alcohol. Jour. Franklin Inst. 190: 373-420. 1920.—A general summary of the subject, including history, legislation, manufacture, pro-

duction, distribution and uses. "Any laboratory may obtain pure ethyl alcohol tax free for use exclusively in scientific research," according to present legislation in the United States.—*Ernest Shaw Reynolds.*

2270. WOLF-CZAPEK, K. W. *Angewandte Photographie in Wissenschaft und Technik.* [Applied photography in science and technology.] 4 vols., illustrated. Union Deutsche Verlagsgesellschaft: Berlin, 1920.

2271. ZILLIG, H. *Kriegsersatz ausländischer technisch verwerteter Pflanzenfasern.* [War substitutes for foreign utilizable plant fiber.] *Jahresber. Ver. Angew. Bot.* 16: 79-116. 1918.

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(See also in this issue Entries 74, 77, 87, 237, 238, 239, 329, 355, 510, 529, 552, 553, 613, 621, 630, 677, 678, 679, 693, 724)

1. ADKINS, D. M. The soya-bean problem. *Sci. Prog.* [London] 15:445-451. 1921.—A brief account is given of the history, economic value, and methods of cultivating the soya-bean.—*J. L. Weimer.*

2. ANONYMOUS. Cotton for automobile tires. *Sci. Amer.* 122:603. 2 fig. 1920.—A brief account of the growing of long-fiber cotton in the Salt River Valley of Arizona.—*Chas. H. Otis.*

3. ANONYMOUS. Cyprus grown tobacco. *Cyprus Agric. Jour.* 14, 15:148-149. 1919, 1920.—Smyrna and Cavalla leaf tobacco produced at Nicosia, Cyprus, contained rather large amounts of nicotine and nitrogen, while the ash had a low percentage of potash. It is believed that with proper knowledge, skill, and care a tobacco leaf can be produced in Cyprus that could be sold in the London market at satisfactory prices.—*W. Stuart.*

4. ANONYMOUS. Failure of potatoes in Cyprus. *Cyprus Agric. Jour.* 15:214. 1920.—Potato growers in Cyprus suffer their chief losses to the summer potato crop, which is normally harvested in May or June. The intense heat of that period makes it difficult to keep the tubers.—*W. Stuart.*

5. ANONYMOUS. Early potatoes at Wisley 1919. *Jour. Roy. Hort. Soc.* 45:360-367. 1919.—Report is made of a test of 121 stocks of early potatoes. The awards of the fruit and vegetable committee and a classification with brief descriptions are given.—*J. K. Shaw.*

6. ANONYMOUS. Fodder plants. *Cyprus Agric. Jour.* 15:204-206. 1920.—The article is devoted to a brief description of some fodder plants: The Moha [Hungarian millet], Sudan grass, buckwheat, white French millet, prickly comfrey, and banana stems.—*W. Stuart.*

7. ANONYMOUS. Periods for which seeds retain their germinating power. *Cyprus Agric. Jour.* 15:213. 1920.—It has been found that oats retain their germinating power 2 years; buckwheat 2-3 years; hemp 3 years; wheat and barley 3-4 years; rye, carrots, and lucerne 4 years; beans, peas, and flax 5 years; cabbage, 5-6 years; and beets 6-7 years.—*W. Stuart.*

8. ANONYMOUS. [Program of work in progress at the cotton experiment stations of the Chinese Cotton Mill Owners' Association.] *Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan* [China Cotton Jour.] 21: 229-247. 1920.—Reports for the fiscal year ending 1920 of the work at 1 central experiment station and 16 sub-stations with a total area of 1300 mows (Chinese acres). The features reported are: Location, date of establishment, soil conditions, procedure of work, training of students, varieties of cotton, diseases and pests, and results.—*Chunjen C. Chen*.

9. ANONYMOUS. Sulphur as a fertilizer for potatoes. *Cyprus Agric. Jour.* 15: 192. 1920.—The experiments noted were conducted on a farm in Chili, the soil of which was rich in organic substances. The application of sulphur on one plot of potatoes gave an increase over the plots without sulphur of 72 per cent and on another plot an increase of 65 per cent.—*W. Stuart*.

10. ANONYMOUS. [Rev. of: HARRIS, F. S. *The sugar-beet in America*. Rural Science Series. xviii + 342 p. Macmillan Company: New York, 1919.] *Sci. Prog.* [London] 14: 511. 1920.

11. BARBER, C. A. Millets for fodder on sugar estates. *Internat. Sugar Jour.* 22: 684-686. 2 pl., 4 fig. 1920.—This third paper gives additional descriptive notes and data on three of the lesser millets which are most productive: Bulrush millet (*Pennisetum typhoides*), Italian millet (*Setaria italica*), and Ragi (*Eleusine coracana*).—*C. Rumbold*.

12. BORNEMANN. Kohlensäure und Pflanzenwachstum. [Carbonic acid and plant growth.] *Mitteil. Deutsch. Landw. Ges.* 35: 693-695. 1920.—More CO₂ is evolved from well manured and well cultivated land than from that unmanured or uncultivated. The purpose of the present experiments was to determine whether the larger yields secured under good cultivation were due in part, at least, to the larger amounts of CO₂ available to the crop. A portion of the garden was laid out into 12 beds, 6 of which were provided with piping by which CO₂ was supplied. Peas, oats, barley, potatoes, onions, and kohlrabi were grown. The plants in the beds supplied with CO₂ were later, larger, and more productive than those in the check beds. The following table gives some of the data presented:

	WEIGHT OF CROP IN GRAMS		PER CENT GAIN
	Without CO ₂	With CO ₂	
Peas.....	532	766	44.1
Oats.....	706	1191	68.7
Potatoes.....	2160	3080	42.6
Onions.....	621	1924	210.0
Kohlrabi (KG).....	11	13	18.2

—*A. J. Pieters*.

13. CRAFTS, H. A. What about our wheat production? *Sci. Amer.* 123: 376, 391. 1920.—Use of good crop rotations to increase the yields of wheat and other crops is discussed. Alfalfa and sugar beets can be utilized for their favorable effects.—*Chas. H. Otis*.

14. DEAN, H. K. The work of the Umatilla Reclamation Project Experiment Farm in 1918 and 1919. U. S. Dept. Agric. Dept. Circ. 110. 3-24, fig. 1-6. 1920.—Data are presented on: Comparative importance of the alfalfa crop during the 9-year period, 1911-1919 inclusive; acreage and yields and farm values of crops; noxious weeds; crop experiments; tests of silage crops; lysimeter work; soil fertility; alfalfa varieties; sheep feeding experiments; and orchard culture experiments.—*L. R. Hesler*.

15. DUNN, H. HAMMOND. **Dunn's on seed wheats.** Salisbury, England. [No date (1920?).]—There are included, among other matter, brief articles with the following captions: A short history of wheat cultivation in Britain; men who have helped towards a great wheat production; botanical notes on wheat; what a grain of wheat contains; manures for wheat; diseases and pests of wheat; varieties of seed wheat; yields of wheat.—*C. Stuart Gager.*

16. DEERR, NOËL. **The origin of the Uba and Cavengerie canes.** *Internat. Sugar Jour.* 22: 680-681. 1920.—Through correspondence with DANIEL DE PASS lately of the Réunion Estate in Natal with regard to the origin of the Uba cane, it appears that the firm of de Pass imported cane from both India and Mauritius to Natal. A cane believed by Mr. de Pass, Sen., to have come from India was planted by him. The label had been damaged, only the letters "Uba" were plain and at the time it was thought the letters represented but a part of the name. As the firm of de Pass obtained cane from India and Mauritius at nearly the same time, it is conceivable that the package thought to have come from India really came from Mauritius. The author then suggests a possible sequence of events covering the origin of the Uba cane, if it came from Mauritius. Cavengerie cane originated in New Caledonia and was taken to Mauritius. It was brought into Porto Rico in 1872; was taken to Brazil where it was called Louzier and under this name was sent to Argentina. It is also grown in Australia, where in some places it is misnamed Cheribon. A similar name, Kavangire, has been applied to the Uba cane, but where and how the name Kavangire was transferred to the Uba cane is not known.—*C. Rumbold.*

17. FABER, HARALD. **The growing of forage crops on the dairy farms of Denmark.** *Scottish Jour. Agric.* 3: 16-26. 1920.—The expansion of the forage crops of Denmark was occasioned by the quantities of cheap grain which came to Europe in the latter part of the nineteenth century. The acreage in roots increased from 6000 in 1861 to 678,000 in 1919. At present 1,900,000 acres are in grass and clover under rotation while 1,100,000 acres are in permanent grass. All the forage roots and most of the grasses are grown from high-yielding strains of Danish seed.—*H. V. Harlan.*

18. FINDLAY, WILLIAM M. **Potato synonyms.** *Scottish Jour. Agric.* 3: 202-207. 1920.—The varieties of potatoes reported were grown at the experimental farm of the North of Scotland College of Agriculture, at Craibstone. The synonyms are not necessarily ones of identical strain but of almost identical type. Fifteen varieties of the Duke of York, 32 of British Queen, 28 of Abundance, and 72 of "Up to date" are reported. The yields recorded show that in most instances the synonymous variety differed more from the type variety in the 1st and 2nd crops after it was acquired than was the case later.—*H. V. Harlan.*

19. GEMMILL, J. F. **Wheat-bulb disease.** *Nature* 106: 148. 1920.—The paper refers to infection by larvae of a fly (*Hylemyia coarctata*) which caused much damage in the east of Scotland during the past season. The eggs are laid among root crops, especially potatoes, and on fallow ground, so that the recommendations of recent German investigators that wheat should be preceded by root crops is based on error.—*O. A. Stevens.*

20. GESSNER, E. R. **Sugar cane farming for the beginner.** [Reprint of Winklespruit Government Experiment Station Bulletin issued in 1919.] *South African Sugar Jour.* 4: 1137-1195. 1920.—A practical account of sugar cane farming in South Africa is given with a discussion of climate, soil, field operations, varieties, and harvesting. The cane belt in South Africa is a narrow strip of country from Port Shepstone on the south to just beyond Samkele on the north. The climate of Zululand is more suited to cane growing than is that of Natal, owing to its greater humidity and heat. The two most valuable types of soil in the cane area are Red Hillside and Black Vlei. The former is more readily brought into good condition for planting—the latter requires more experience in handling. There is a 3rd soil type found along the river bank and flats, liable to flooding by heavy rains, but of excellent productivity when the weather conditions are favorable. From experiments at the Winklespruit

station it was found that cane 12 months old is best for planting. Middle and tip portions of cane give better growth than butts for both the Uba, the standard variety, and the Agual, a recent introduction from India. Uba has long proved best adapted to local conditions. In Natal and Zululand fertile seed has never been produced by this variety, which makes crossing with Uba cane impossible in this section. Soft canes are seldom grown in this country. Several varieties have been tested at the experiment station and work is being continued with the more promising ones.—*E. Koch Tisdale.*

21. HANSEN, ALBERT A. **Chicory, control and eradication.** U. S. Dept. Agric. Dept. Circ. 108. 2-4. *Fig. 1.* 1920.—Chicory, a troublesome weed in pastures, meadows, and along roadsides in the northern half of the United States, is described. Its distribution and uses are given. Eradication and control measures are discussed.—*L. R. Hesler.*

22. HANSEN, ALBERT A. **The hawkweeds or paintbrushes.** U. S. Dept. Agric. Dept. Circ. 130. 3-7. *Fig. 1-2.* 1920.—Three noxious hawkweeds are described, namely, orange hawkweed (*Hieracium aurantiacum*), king-devil (*H. florentinum*), and yellow field hawkweed (*H. pratense*). Eradication and precautionary measures are given.—*L. R. Hesler.*

23. HAYWOOD, A. H. **Sacaline at Wollongbar experiment farm.** Agric. Gaz. New South Wales 29: 886-887. 1 *fig.* 1918.—Sacaline, recently introduced from Victoria, is a local name for a strain of sweet sorghum (*Andropogon sorghum*), which seems to have developed perennial habits. It attains a height of 12 feet, stools well, matures seed freely, has the ratooning habit and is considered more valuable than other sorghums. One grower is said to have obtained 9 cuttings. Chemical analysis is given.—*L. R. Waldron.*

24. HEADLEY, F. B. **The work of the Newlands Reclamation Experiment Farm in 1919.** U. S. Dept. Agric. Dept. Circ. 136. 3-21. *Fig. 1-3.* 1920.—The report gives yields and market value of alfalfa, barley, oats, wheat, potatoes, hay, pasture, garden and miscellaneous crops; variety tests of wheat, barley, and potatoes; tests of horticultural crops, including tomatoes and sweet corn; blossoming date for varieties of apples, pears, plums, and prunes; and concludes with an account of experiments made in the reclamation of alkali soil.—*L. R. Hesler.*

25. IVERSEN, K. **Lokale Markforsøg i Danmark.** [Local field experiments in Denmark.] Nordisk Jordbrugsforskning (København) 1920: 102-120. 1920.—The author summarizes and discusses experiments carried on with fertilizers, high yielding strains, seed disinfection and potato sprayings by a large number of local experimenters and by farmers' unions during the years 1893-1919. The increased crop yields are compared with the amount of artificial fertilizers applied and with the varying costs of the fertilizers and treatments.—*Ernst Gram.*

26. JOHNSON, E. **Behavior of inoculated leguminous seed.** Monthly Bull. Dept. Agric. California 9: 31-36. 1920.—Nitrogen-fixing bacteria exist in several forms, i.e., bacteria from certain legumes will not inoculate certain other legumes. Legumes are divided into 14 groups. The organisms from the nodules of any legume can inoculate any other legume within the same group only. In the field, the organisms can withstand any degree of acidity or alkalinity that the corresponding legume can endure. Inoculation does not render the plant immune to any of the diseases to which it is susceptible, does not increase its resistance to frost, sunburn, alkali, acidity, drought or excess moisture, and does not in any way alter its habit of growth.—*E. L. Overholser.*

27. KELBERGER, L. RITTER, UND F. SCHONHEIT. **Welche Leistungen können wir vom Anbaheimischer Sommerölfrüchte erwarten.** [What result may we expect from the culture of domestic summer oil plants.] Mitteil. Deutsch. Landw. Ges. 35: 705-713. 1920.—A general paper on the culture of oil producing plants, such as mustard and rape, together with tables giving the results of tests.—*A. L. Pieters.*

28. KERLE, W. D. **Farmers' experiment plots. Maize experiments, 1919-20. Upper north coast district.** Agric. Gaz. New South Wales 31: 875-881. 1920.—Experiments were conducted on various private farms in the district. In variety trials of maize a maximum yield of 85 bushels per acre was secured from Improved Yellow Dent. The maximum net gain secured by using mineral manures amounted to 25 bushels, or \$43.25 per acre. With but one exception, the use of mineral manures showed net gains over land receiving no manure at all.—*L. R. Waldron.*

29. KUO, TAN HSIEN. **A plan for cotton improvement at the Chinese Cotton Mill Owners Association.** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 1³: 4-8. 1920.—A plan is outlined for the establishment of cotton breeding experiment stations, the organization of scientific departments and staffs, and the nature of the contemplated work, with the object of increasing the yield and quality of cotton in China. A five-year program for proposed projects in cotton breeding is also given.—*Chunjen C. Chen.*

30. KUO, TAN HSIEN. [Translation of: TODD, JOHN A. **The world's cotton crops.** A. and C. Black: London, 1914.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 1⁴: 206-228. 1920.

31. LAUDER. **The electrical treatment of seeds.** Scottish Jour. Agric. 3: 340-344. 1920.—Reports of farmers and some early field tests support the claims of the originators of the WOLFERN process as to greater returns from treated seed. Subsequent tests more carefully made show no such advantage. Treating oats was found unprofitable by A. F. WILSON in West Lothian and by JOHN WALKER in Berwickshire and Roxburghshire. MARTIN H. F. SUTTON at Reading compared yields and germinations in seeds of carrots, swedes, cabbages, and mangolds. In each case treated seed was compared with untreated, and with seeds immersed in solutions of salt and sulphate of ammonia. All yield differences were within the limits of experimental error.—*H. V. Harlan.*

32. LEMMERMAN, O. **Ueber die Kohlensäureernährung der Pflanzen.** [On the carbonic acid nutrition of plants.] Mitteil. Deutsch. Landw. Ges. 35: 696-699. 1920.—The author refers to BORNEMANN's theory (see Bot. Absts. 8, Entry 12) that stable and green manures evolve CO₂ and that this stimulates growth, and shows that his experiments give no support to the Bornemann theory. He found that the air over pots of soil liberally supplied with organic material contained very small amounts of CO₂ but that the air drawn through such pots contained quantities of CO₂ approaching the theoretical maxima from the organic material applied. Pot and field experiments were conducted in various ways but in no case was there a larger crop that could be attributed to an increase in the CO₂ content of the air.—*A. J. Pieters.*

33. LOMANITZ, S. **The oil of the prickly pear seed.** Jour. Indust. Eng. Chem. 12: 1174-1175. 1920.—The oil apparently falls into the group of semi-drying oils, and if produced in sufficient quantities might be used in some of the oil-products industries.—*Henry Schmitz.*

34. McCauley, C., and L. G. LITTLE. **Ploughing experiments at Cowra and Nyngan.** Agric. Gaz. New South Wales 31: 837-840. 1920.—Wheat was grown on land plowed shallow, medium, and deep, by disc and mold board plows, and also upon sub-soiled land. In no case was the more expensive treatment decisively favorable and at Nyngan, particularly, the cheaper methods gave best results.—*L. R. Waldron.*

35. McDONALD, A. H. E. **The saving of seed wheat.** Agric. Gaz. New South Wales 31: 841-842. 1920.—Suggestions are offered in regard to distribution of proper wheat varieties, following drouth conditions.—*L. R. Waldron.*

36. MAIDEN, J. H. **Chats about the prickly pear.** No. 7. Agric. Gaz. New South Wales 31: 889-893. 1920.—Use and value of different exterminators of prickly pear (*Opuntia* spp.) are discussed, including arsenite of soda and arsenious chloride. Literature is cited.—*L. R. Waldron.*

37. MAKIN, R. N. Some recently introduced fodder plants. Agric. Gaz. New South Wales 31: 873-874. 1920.—Brief cultural notes are given on Sudan grass, elephant grass (*Pennisetum purpureum*), and saccaline (*Andropogon sorghum*).—L. R. Waldron.

38. MATERNAERS, F. F. Der Grubensilo und der Schanzensilo. [The pit silo and the tank silo.] Mitteil. Deutsch. Landw. Ges. 35: 673-679. 1920.—Detailed descriptions, with diagrams, of methods of constructing the pit and the tank silo.—A. J. Pieters.

39. NEWHALL, C. A. The direct identification of soy-bean oil. Jour. Indust. Eng. Chem. 12: 1174-1175. 1920.—A method of identification of soy-bean oil involving the use of uranium acetate or uranium nitrate is discussed.—Henry Schmitz.

40. OEERSTEIN. Ueber einige seltenere Luzerne und Wollklettenbeischlüsse. [Concerning some rare lucerne and woolcombing enclosures.] Landw. Jahrb. 53: 627-637. 1919.—The author describes some impurities and adulterants found in lucerne seed which appear to indicate the source as Persia and Asia Minor. The seeds secured from wool combings proved to be those of *Medicago denticulata* and *M. maculata*.—A. J. Pieters.

41. PARDY, ALEXANDER. Broadcasting versus drilling oats. Scottish Jour. Agric. 3: 232-236. 1920.—In a 4-year test in northern Scotland the high yields of grain were obtained by 4 different methods of seeding, in the following order: cross drilled, broadcast and drilled, broadcast, and single drilled. The total average difference was less than 3 bushels. In seeding, 6 bushels were used on the drilled plots, 7 on the plot drilled and broadcast, and 8 on the broadcast plot.—H. V. Harlan.

42. PIUTTI, A. Sur l'action de la chloropicrine sur les parasites du ble et sur les rats. [The effect of chloropicrine on the parasites of wheat and on rats.] Compt. Rend. Acad. Sci. Paris 170: 854-856. 1920.—Results are given of experiments in the use of chloropicrine as an insecticide for wheat. The seed was treated with a dose of 10 cc. per cubic meter. The loss in percentage of germination was found to be 30. Flour and bread made from seed treated in this way showed no deleterious effect.—C. H. Farr.

43. RØRDAM, K. Undersøgelse af olieholdige Frø af en ukendt Plante. [An unknown plant with oil-containing seed.] K. Veterinaer og Landbohøjskole Aarsskr. 1920: 36-42. 1920.—An undetermined rape hybrid, seed of which was found as a contamination in Russian flax seed, upon analysis proved to have about the same chemical composition as rape seed, and is being taken up for comparative experiments at the state experiment stations.—Ernst Gram.

44. SHEAR, W. V. How certified seed potatoes will benefit the California potato industry. Monthly Bull. Dept. Agric. California 9: 375-381. 1920.

45. SYMON, J. A. The turnip crop of Scotland. Scottish Jour. Agric. 3: 26-35. 1920.—In 1919 turnips were grown on 426,251 acres of the 3,408,479 acres of arable land in Scotland. For sanitary reasons turnips are grown in 5, 6, or 7-year rotations. The largest seeds produced the largest plants. The seed is drilled in ridges 28 inches apart. Seeding should be completed before May 25. Phosphorus is the most important fertilizer for the turnip crop.—H. V. Harlan.

46. THOMPSON, H. C. The manufacture and use of peanut butter. U. S. Dept. Agric. Dept. Circ. 128. 3-16. Fig. 1-6. 1920.

47. TUNG, SHIH CHIN. [Kaoliang and breeding.] (Text in Chinese.) Khu-Shou [Science-Publ. Chinese Sci. Soc.] 5: 712-716. 1920.—A general discussion is presented of *Andropogon sorghum* varieties *obovata*, *saccharatus* and *vulgare* regarding root systems, drought resistance, relations to soil, self-fertilization and cross-fertilization, poisonous content, and adaptability to all kinds of soil. Methods of producing pure seeds from desirable plants and methods of cross-pollination are described. The head-to-row system of individual

selection is also outlined. The important factors to be considered in making selections in kaoliang breeding are: Sugar content, earliness, disease resistance, drought resistance, productivity, erectness, and shape.—*Chunjen C. Chen.*

48. VENDELMANN, HENRY. **Reclamation of waste land.** *Scottish Jour. Agric.* 3: 319-328. 1920.—Waste land is reclaimed in South England and Belgium for agriculture, forestry, and fisheries. Winter wheat, spring oats, turnips, rape, buckwheat, and potatoes are favorite first crops. Pine, larch, spruce, and poplar are more commonly used in tree plantings. Where fish are grown in shallow ponds, which are drained and cultivated every third year, an unusual rotation of fish and oats occurs.—*H. V. Harlan.*

49. WALSTER, H. L. **Earliness and rustiness of spring wheats.** *North Dakota Agric. Exp. Sta. Bull.* 143. 8 p., 1 fig. 1920.—Yields of varieties Red Bobs, Prelude, Ruby, Kitchener, Pioneer, and Marquis are given and also amounts of stem rust (*Puccinia graminis*) occurring on each in different years. Marquis has given best yields.—*L. R. Waldron.*

50. WATSON, ROBERT. **Agriculture in Orkney.** *Scottish Jour. Agric.* 3: 306-315. 1920.—Early maturing and non-shattering varieties of oats and barley are grown, also grasses and white and red clovers. The Sandy variety of oats and 6-rowed barley, which are early maturing and non-shattering, are grown. The "Up-to-date," Abundance, and British Queen varieties of potatoes are cultivated.—*H. V. Harlan.*

51. WENHOLZ, H. **Pigeon pea (*Cajanus indicus*).** *Agric. Gaz. New South Wales* 31: 888. 1920.—Cultural notes are given.—*L. R. Waldron.*

52. WILLIAMS, CHARLES BURGESS, AND DANIEL HARVEY HILL. **Corn book for young folk.** 260 p., 186 fig. Ginn and Company: Boston, 1920.—This book, which is designed to interest and enlighten the very young agriculturists of the country, relates the story of corn and its culture in a simple, readable style. At the conclusion of each chapter the important facts contained therein are brought out by questions.—*C. V. Piper.*

53. YEH, YUEN TING. [Standard varieties of American cotton and selection.] *Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau* [China Cotton Jour.] 14: 235-245. 1920.—Methods are discussed and described of maintaining the purity of cotton varieties developed by the U. S. Department of Agriculture through selection. Outlines of 5-year system in mass selection and 7-year system in progeny selection for use in China are given. A descriptive table is given of the characteristics of Acala, Columbia, Durango, King, Lone Star, and Trice.—*Chunjen C. Chen.*

54. YEH, YUEN TING. [A study of cotton production in China.] *Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau* [China Cotton Jour.] 12: 233-241; 13: 221-236. 1920.—The author reports a two months' investigation of the Chinese cotton-growing situation made in the summer of 1919 with Mr. O. F. Cook, U. S. Department of Agriculture. Nine provinces were surveyed: Kiangsu, Chekiang, Anhwei, Shantung, Chihli, Honan, Hunan, Hupeh, and Kiangsi. The climate of the northern part of the region is dry, while the southern part is wet. The soils vary from heavy clays to sandy loams. Mass planting is the common practise, though row-planting is used to some extent. American varieties are quite common throughout the region. Chinese cotton is of two kinds, brown and white. American cotton consists mostly of the following varieties distributed by the U. S. Department of Agriculture: Lone Star, Trice, King, Acala, Durango, Columbia, Egyptian, and Sea Island. A species of Chinese Upland cotton was observed but no record of its origin was found. The provinces of Chihli, Honan, Shansi, Shensi, and Shantung are said to be suited to growing American cotton. The following cotton insects were observed: Bollworm, pinkworm, leaf-hopper, red spider, cutworm, and cotton caterpillar. Diseases noted were anthracnose, rust, shedding of bolls, angular leaf spot, and damping-off. Five governmental cotton stations and 9 private stations visited by the author are listed. Suggestions for improving Chinese cotton are given: (1) Careful selection and variety test; (2) close planting and late chopping; (3) deep plowing and frequent cultivating; (4) better drainage in the southern region; and (5) Trice is considered to be adaptable in China.—*Chunjen C. Chen.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 15, 17, 162, 163, 165, 192, 324, 377, 687, 692, 737, 744)

55. ANONYMOUS. International catalogue of scientific literature. *Nature* 106: 195-196. 1920.—Review of the history of the catalogue and of a conference to consider its continuation.—O. A. Stevens.

56. ANONYMOUS. Some new botanical memoirs. *Sci. Prog.* [London] 14: 644-645. 1920.—The appearance of a new botanical publication entitled "Botanical Memoirs" initiated and edited by A. H. Church, Botany School, Oxford, is noted.—J. L. Weimer.

57. ANONYMOUS. Texas Pecan Growers Association organized. *Amer. Nut Jour.* 12: 86-87. 1920.

58. ANONYMOUS. [Rev. of: GEDDES. The life and work of Jagadis C. Bose.] *Jour. Botany* 58: 299. 1920.

59. BASTIAN, W. The origin of life: The work of the late Dr. Charlton Bastian, F.R.S. *Sci. Prog.* [London] 14: 461-462. 1920.—Dr. Bastian believed that living matter is constantly coming into being in suitable environment, a process which he termed "archebiosis." He claimed to have brought about the *de novo* origin of definite well-known living organisms from certain colloidal saline solutions enclosed within hermetically sealed and sterilized glass tubes.—J. L. Weimer.

60. BRAGG, LAURA M. Contributions toward a history of science in South Carolina. I—Henry W. Ravenel, LL.D.—*Charleston Mus. Bull.* 16: 17-23. 1920.—Twelve specimens of Ravenel's fungi recently added to the museum herbarium are listed, and several interesting letters to Professor LEWIS R. GIBBES of Charleston are reproduced.—Neil E. Stevens.

61. BRITTEN, JAMES. Bibliographical notes, LXXIXa, Lehmann's Pugillus, I. *Jour. Botany* 58: 292-293. 1920.—Corrections are here made of a previous paper on the same subject (*Jour. Botany* 58: 108).—The inspection of an original issue of No. 1 at Kew showed the author to be in error in ascribing the original description of 8 species of cacti to Nov. Acta instead of to the Pugilli. Other slight errors are pointed out.—K. M. Wiegand.

62. B[ITTEN], J[AMES]. John Reader Jackson. *Jour. Botany* 58: 298. 1920.—A biographical sketch of J. R. Jackson (1837-1920) for 43 years Curator of the Kew Museums.—K. M. Wiegand.

63. BRITTON, N. L. Report by the Director-in-Chief upon a visit to botanical institutions in England. *Jour. New York Bot. Gard.* 21: 197-208. 1920.—Information is presented on the plant collections, botanical research, and personnel at Kew and elsewhere.—H. A. Gleason.

64. CONDIT, I. J. Bits of fig history in California. *Monthly Bull. Dept. Agric. California* 8: 260-265. 1919.

65. DEWITZ, J. Die Immunsande. Zusammenstellung der Literatur über die für die Reblaus immunen Sande. [Immune soils. A bringing together of the literature concerning the soils immune to Phylloxera.] *Landw. Jahrb.* 35: 435-484. 1919.—The author calls attention to the fact that it has long been known that Phylloxera can not live in certain soils. The literature is, however, old and inaccessible, so the author has brought this together in the above paper.—A. J. Pieters.

66. DORPH-PETERSEN, K. Frederik Kølpin Ravn. *Nat. Verden* [København] 4: 289-301. *Portrait.* 1920.—A scientific and personal appreciation.—Ernst Gram.

67. FAWCETT, W. William Harris. Jour. Botany 58: 298-299. 1920.—A short biographical sketch of William Harris (1860-1920), best known for botanical exploration in Jamaica.—K. M. Wiegand.

68. FERDINANDSEN, C. F. Kølpin Ravn. Nordisk Jordbrugsforskning [København] 1920: 137-142. Portrait. 1920.—An account of the life and work of Professor Ravn (1873-1920) by his successor.—Ernst Gram.

69. RAVN, F. KØLPIN. Experiments in plant culture in Denmark. Scottish Jour. Agric. 3: 207-214. 1920.—There are 8 state experimental stations dealing with agricultural problems and 3 with horticultural problems. Plant improvement has made remarkable progress especially in root crops and forage plants. New strains originated by institutions and individuals are tested in open competition by the state experiment station and the results determine the market demand for the seed.—H. V. Harlan.

70. RAVN, F. KØLPIN. Praktisk Erfaring og videnskabelig Forskning i Plantepatologiens Historie. [Practical experience and scientific research in history of phytopathology.] Nat. Verden [København] 4: 302-316. 1920.—A demonstration of coöperation in the development of seed disinfection, protectional spraying, frost control, and report service.—Ernst Gram.

71. ROSIN, JOSEPH. Arthur Meyer. Jour. Amer. Pharm. Assoc. 9: 851. Portrait. 1920.—A brief sketch of the life and botanical activities of Arthur Meyer.—Anton Hogstad, Jr.

72. SALISBURY, E. J. [Rev. of: BOWER, F. O. Joseph Dalton Hooker. 62 p. Society for Promoting Christian Knowledge: London, 1919.] Sci. Prog. [London] 14: 692. 1920.

73. STEVENS, F. L. Changes of a decade in plant pathology. [Abstract.] Phytopath. 10: 65. 1920.

74. TROOST, D. Overzicht van de in ons land verbouwde tarwerassen. [Review of cultivated wheat races in our country.] Cultura 32: 226-244. 1920.—The occurrence of wheat varieties in the Netherlands is chronologically divided into the periods 1806-40, 1840-65, 1865-1900, and after 1900. Polish wheat (*Triticum polonicum*) was well known at the beginning of the nineteenth century. In 1826 in the province of Sealand, Russian was grown for the first time, and in 1834 came Giant, also known as Syrian wheat (*T. turgidum*). In 1835 the price of wheat declined in Friesland and Groningen, consequently wheat raising diminished, but with higher prices in 1839 more wheat was grown. Red wheat then became more common, and Zeeuwsche (Sealand) wheat came into favor. In 1840 the Whittington was introduced, originally found in Switzerland by Whittington. Chiddam was grown from about 1850, and Zeeuwsche wheat was more largely cultivated. From 1865 to 1900 many English varieties were introduced, such as Squarehead, Prolific, Rough Chaff, Essex, Victoria, and others, most being of excellent quality though some were not sufficiently resistant to frost. A variety of Polish wheat has been raised since 1870, and the Dikkop (thick-head), discovered in a field with English wheat in 1865, is still to be found. In 1886 reciprocal crosses were made by BROEKEMA between Zeeuwsche and Squarehead, from which originated Duivendal and Spijk, both of good quality. MANSHOLT obtained the Fletumer wheat, which because of its hardiness was of much value in the northern province of Groningen. In 1889 Broekema again crossed Squarehead with Zeeuwsche, obtaining an excellent strain, which in 1901 was called Wilhelmina, at present the leading variety. Other good varieties of late years are Millioen and Imperial, from which was derived the improved strain Imperial II a.—J. C. Th. Uphof.

75. WARNER, MARJORIE F. Bibliographical Notes, LXXXII. The dates of Rheede's "Hortus Malabaricus." Jour. Botany 58: 291-292. 1920.—The date of part 4 is shown to be 1683 instead of 1673. The diversity in title pages of the various volumes of this work, and even between corresponding volumes of different sets is noted, and readers are requested to make public information which supports any date earlier than 1678 for the first volume.—K. M. Wiegand.

76. WHETZEL, H. H. Institute for plant protection. Sci. Amer. Monthly 2: 174-175. 1920.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 8, 167, 286, 606)

77. ANONYMOUS. [Rev. of: CRABTREE, J. H. *Grasses and how to identify them.* 64 p. The Epworth Press: London (no date).] *Nature* 105: 805. 1920.

78. ANONYMOUS. [Rev. of: ELLIS, G. S. M. *Applied botany.* viii + 248 p., 67 illus., 2 maps. Hodder & Stoughton: London, 1919.] *Sci. Prog.* [London] 14: 692-693. 1920.

79. ANONYMOUS. [Rev. of: MARTIN, J. N. *Botany for agricultural students.* x + 585 p. John Wiley & Sons: New York; Chapman & Hall: London; 1919.] *Sci. Prog.* [London] 14: 512-513. 1920.

80. ANONYMOUS. [Rev. of: PETERS, C. A. *The preparation of substances important in agriculture: A laboratory manual of synthetic agricultural chemistry.* 3rd ed., vi + 81 p. Chapman & Hall: London; John Wiley & Sons: New York; 1919.] *Sci. Prog.* [London] 14: 513. 1920.

81. ANONYMOUS. [Rev. of: WILLIS, J. C. *A dictionary of the flowering plants and ferns.* 4th ed., lxxvii + 712 p., 41 fig. Cambridge University Press: 1919.] *Sci. Prog.* [London] 14: 508-509. 1920.

82. BERRY, JAMES B. *Vocational forestry education.* *Jour. Forestry* 18: 730-731. 1920.

83. DAVIS, BRADLEY M. *Introductory courses in botany.* V. *School Sci. and Math.* 20: 692-696. 1920.

84. HARRIS, G. W. *Experimental farming.* *Sci. Prog.* [London] 14: 458-461. 1920.—The writer feels that before the agricultural scientist can be of the greatest assistance to the farmer he must become more familiar with the practical problems of farm life.—J. L. Weimer.

85. KÜSTER, ERNST. *Lehrbuch der Botanik für Mediziner.* [Text-book of botany for medical students.] 420 p., 28 fig. (some colored). F. C. W. Vogel: Leipzig, 1920. [Price of volume, unbound, 85 M; bound, 100 M.]—The first 57 pages are devoted to the gross morphology of cryptogams and phanerogams, with emphasis on the latter. Anatomy is treated in the following 44 pages, about equal space being given to cell study (cytology) and tissue study (histology). Physiology occupies 75 pages, reproductive processes in phanerogams and cryptogams as well as variability, inheritance, mutation, etc., being included in this chapter. Thirty pages are devoted to "plant chemistry," the latter treated under 15 heads according to the nature of the compounds treated. Pathology occupies 35 pages, about half devoted to physiological disturbances not due to parasites (discussed under 9 heads) and half to plant diseases due to parasites, about equal space being given to plant and animal parasites.—The second part of the book (150 pages) is entitled special, or systematic, botany. The entire plant kingdom is treated, the enumerated forms, however, being almost exclusively those of practical importance as sources of food, drugs, poisons, raw products of use in industry, and the like.—All parts of the book are profusely illustrated. An extensive 20-page subject index is included.—J. R. Schramm.

86. LANE-POOLE, C. E. *Professional forestry education.* *Australian Forest. Jour.* 3: 217-223. 1920.—A paper read at the Hobart Forestry Conference. The author advances argument for the establishment of a federal forestry school organized along the lines of the French school at Nancy, considered the best of its kind in Europe. The curriculum, faculty, terms, fees, and certain other details of organization are discussed. New South Wales, on

account of the great diversity of its forest conditions, is suggested as the most desirable state in Australia for the school.—*C. F. Korstian*.

87. SUN, EN LIN. [A summer course in cotton-growing at the Nanking Teachers' College.] *Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau* [China Cotton Jour.] 21: 218-223. 1920.—The program is outlined of a 6-week course designed to give the student a fundamental knowledge of cultural methods and breeding technique of the cotton crop. A list of the members of the instructing staff and a curriculum are also given.—*Chunjen C. Chen*.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEORGE S. BRYAN, *Assistant Editor*

(See in this issue Entries 221, 254, 273, 292, 328, 330, 333, 342, 442, 605)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

G. D. FULLER, *Assistant Editor*

(See also in this issue Entries 1, 168, 182, 395, 432, 437, 442, 453, 585, 683, 684, 686, 687, 689, 692, 695, 696, 701, 702, 703, 708, 719, 720, 727, 728, 730, 732, 735, 739, 744)

GENERAL, FACTORS, MEASUREMENTS

88. BRADSHAW, R. V. Color variations in flowers. *Amer. Bot.* 26: 23, 24. 1920.—Additions to the list of flowers with varying color published in *American Botanist* for Aug. 1919.—*W. N. Clute*.

89. HAUGH, L. A. Klimaets Indflydelse Paa Udviklingen af Bogens Sommerskud. [Influence of climate on the development of summer growth of beech.] *Dansk. Skovforenings Tidsskr.* 4: 13-28. *Fig. 4.* 1919.

90. LE PLASTRIER, G. M. Notes on loranths from Wagga district. *Australian Nat.* 4: 139. 1920.—It is observed that the mistletoes of the region grow on hosts having leaves of a form similar to those of the parasite; thus they are hard to detect.—*T. C. Frye*.

91. PORSILD, A. E. Sur le poids et les dimensions des graines arctiques. [On the weight and dimensions of arctic seeds.] *Rev. Gén. Bot.* [Paris] 32: 97-120. 1920.—Contrary to the thesis of SCHUEBELER, author finds after many determinations and comparisons that seeds of plants grown in arctic regions (Greenland) are relatively lighter than those of the same or related species grown in alpine or temperate regions.—*L. W. Sharp*.

92. WHERRY, EDGAR T. Soil tests of Ericaceae and other reaction-sensitive families in northern Vermont and New Hampshire. *Rhodora* 22: 33-49. 1920.—A record of field experiments carried out by the author to determine the acidity and the alkalinity of soils in which several species of the Ericaceae and some other plants were growing. The determinations were made by indicators in the field according to a method recently described by the author (*Jour. Wash. Acad. Sci.* 10: April, 1920). The studies were made during June, 1919, in a variety of mountain, bog, and swamp areas in New Hampshire and Vermont, each of which is described. The general and local soil conditions in each are given, together with lists of plants found. All of the Ericaceae, with one exception (*Pyrola asarifolia* Michx.), were found in soils giving an acid reaction, although the members of the subfamily Pyroloideae, when compared with members of the other subfamilies, grew more abundantly in soils of rather low specific acidity. The exceptional species, *P. asarifolia*, was found only in neu-

tral soils. Among the Orchidaceae, the northern species seemed to attain their greatest development in circumneutral soils, i.e., neutral or only weakly acid or alkaline soils, while most of the southern species apparently preferred more acid soils.—The paper concludes with a list of plants studied, other than those of the above two families, which proved to be oxyphytes, and a list of those which were found to be calcicoles.—*James P. Poole.*

93. WHERRY, EDGAR T. The soil reactions of certain rock ferns—I. Amer. Fern Jour. 10: 15-22. 1920.—The author gives a table, "Classification of Rock Ferns on the Basis of Soil Reaction," listing 7 acid soil plants and 18 calcareous soil plants. He then discusses 7 individual species representing 4 genera.—*F. C. Anderson.*

STRUCTURE, BEHAVIOR

94. JAKES, H. E. Some phenological records of spring flowering plants of Henry County. Proc. Iowa Acad. Sci. 25: 413-415. Fig. 162. 1920.—Dates of first flowering of twenty species appearing in March, April, and May, 1915-1918, at Mt. Pleasant, Iowa, are shown in a table. Six species are shown on a graph. In 1916 *Acer saccharinum*, *Phlox divaricata*, and *Berberis vulgaris* bloomed later than in any other year. But *Sanguinaria canadensis* and *Acer negundo* bloomed latest in 1917.—*H. S. Conard.*

95. SCHMIDT, WILHELM. Die Verbreitung von Früchten durch die Luftbewegung. [The distribution of seeds by air currents.] Naturwissenschaften 7: 810-812. 1919.—Formulae are developed whereby the distances to which winged seeds and pollen may be carried by the wind can be determined.—*Orton L. Clark.*

96. STEVENS, O. A. Notes on species of *Halictus* visiting evening flowers (Hyn.). Entomol. News 31: 35-44. 1920.—Some observations on four species of bees visiting evening flowers, particularly primroses, are recorded. One species is new; this one and two others are especially adapted to collecting pollen from the Onagraceae, due to a sparseness of the scopa which makes possible the adhesion of the pollen mass. Observations on the opening of the flowers and the visits of the bees are recorded for *Megaptermium missouriense*, *Allionia hirsuta*, *Onagra strigosa*, *Anogra pallida*, and *Gaura coccinea*. These bees fly about the flower buds before any sign of opening is visible; at the first small opening they force their way in, one or two visits stripping the flower of its pollen mass. A group of *Onagra* plants observed at intervals showed that most of the flowers open at 9:00 p.m., although some were found to open later in the evening.—*Wanda Weniger.*

97. WEAVER, J. E. The ecological relations of roots. Carnegie Inst. Washington Publ. 286. 128 p., 30 pl., 58 fig. 1919.—The root habits of about 140 species of dominant and subdominant shrubby and herbaceous plants occurring under a wide range of environmental conditions and studied in the field are described and in part figured by habit photographs and root maps. The communities represented in the research include the chaparral of southeastern Nebraska, the prairies of eastern Nebraska and of southeastern Washington, "the plains association and sandhill subclimax of Colorado, and the gravel-slide, half-gravel-slide, and forest communities of the Rocky Mountains of Colorado." With the description of the root systems of each community is given an account of the temperature, precipitation, evaporation, wind movements, and notes on the soil conditions, including the moisture content.—In the prairies of eastern Nebraska more than half of the plants studied have roots which penetrate to a depth exceeding 5 feet, with a maximum penetration of 13-20 feet. The roots exhibit a condition of layering with accompanying reduction of competition of contiguous species for soil moisture. The soil is loess and glacial drift, and the water content of the upper 4-5 feet may be so reduced that none is available for plant growth. About 71 per cent of the rainfall occurs during the growing season. The mean summer temperatures are high and the mean humidity is often low. The wind averages about 70 miles per day.—The plants of the prairie community of southeastern Washington are not so deeply rooted as are those of the Nebraskan prairies. Out of a total precipitation of 21 inches annu-

ally only about one-third occurs during the season of growth. Sometimes the water content of the soil to a depth of 3 or 4 feet is reduced to the point where it is not available for plant growth. Roots penetrate more deeply in loess than in glacial drift soils. Aeration may also be a factor of importance in these differences in root penetration.—The chaparral community, between the Ohio-Missouri forest complex and the prairies to the westward, have plants with well developed absorbing systems. The roots penetrate to a depth of 5.5 to 21 feet, but all are deeply placed. Vegetative propagation is a feature in this community.—In the plains the plants are more deeply rooted than in the prairies although the extreme depth attained in certain instances was found to be less. The generalized type of root system is most common. The precipitation is about 15 inches, 80 per cent of which falls during the season of growth. Water does not penetrate to a depth greater than 13 feet, or that marking the deepest placing of the roots. The prominence of shallow, widely spreading laterals is a feature of certain species, as in the cacti and in *Yucca*. At certain periods during the summer no water is available in the soil for plants to a depth of 5 feet, and it is uniformly dry to a depth of 7 feet. The subaerial plains environment is characterized by active wind movements, great daily fluctuations in air temperature, and relatively high evaporation throughout the growing season.—In the sandhills the roots are various, although long, widely spreading roots in the upper soil stratum, within 2 feet of the surface, are possessed by nearly all of the species studied. Several plants which develop deep roots in the plains have only shallow roots in the sandhills. The subaerial environmental conditions are similar to those of the plains and differences in root development are attributable to edaphic causes. The upper 2-3 feet of soil carry more moisture than the deeper soil. The most extensive root system of any seen, that of *Ipomoea leptophylla*, was found in this community.—In the gravel-slide community the roots of all plants are shallowly placed, few lying below a depth 1.5-2 feet. This is related to the frequent summer showers of little penetration. The roots in the half-gravel-slide are shallowly placed, as in the gravel-slide, but also supplementary deep roots are developed. This is related to more favorable deep-soil conditions. Intense shallow-root competition occurs in the half-gravel-slide. Reliance on water of the deeper soils, a feature of this community, carries the plants over periods of drought.—In the forest a relatively shallow-rooted condition is to be found and this is true of many trees as well as of lesser plants. This characteristic is related to the distribution of moisture in the soil, which is most abundant in the surface layers. The roots also have relatively poor lateral development.—Where species occur in distinctly different habitats the root development generally conforms to the community root type, although exceptions were found in a few instances.—*W. A. Cannon.*

98. WEAVER, J. E. Ecological relations of roots. [Abstract.] Publ. Nebraska Acad. Sci. 10: 15-16. 1920.—See Bot. Absts. 8, Entry 97.

VEGETATION

99. ANDERSEN, EMMA N., AND ELDA R. WALKER. An ecological study of the algae of some sandhill lakes. Trans. Amer. Microsc. Soc. 39: 51-84. Pl. 3-12, fig. 1-17. 1920.—This study was made in Cherry county, western Nebraska, in the sandhill country abounding in bodies of water. The latter vary in size from mere ponds to lakes 3 or 4 square miles in area, and in depth from 2 to 15 feet. The lakes are surrounded by grassy meadows and sand dunes. The climate is dry, windy, hot in summer and cold in winter. By analysis the water of the different lakes varies in alkalinity from 111 to 1129 parts per million. Many migratory birds visit the lakes, probably bringing the spores of many algae on their feet.—The work was limited to a few localities representative of the different types of habitat of the region. Climatic conditions—daily variations of temperature of air and water at different depths—were obtained by use of standard instruments. For the study of light intensity at different depths a modification of the solio photometer was used.—The lakes were found of fairly uniform temperature, aeration, and alkalinity. Two factors influence the distribution of algae, light and mechanical support. Nine lakes were studied, and lists of algae found in early summer, midsummer, and in October are given. It is concluded that the occurrence of algae in a given body of water is due largely to seasonal periodicity, mineral and gas content of the water, and light intensity.—*S. H. Essary.*

100. HAYDEN, ADA. Notes on the floristic features of a prairie province in central Iowa. Proc. Iowa Acad. Sci. 25: 369-389. Fig. 145-161. 1920.—The area shows four formations: upland prairie, meadow, swamp, and pond, with several consocieties. Lists of plants of each consocieties are given, with some notes on soils. Reversion takes place slowly and is rare. Evidence of invasion of the prairie by forest in ravines or on moist slopes is not uncommon. The figures are photographs of typical plant groups and habitats.—H. S. Conard.

101. KASHYAP, S. R. Note on the floating islands of Riwalsar. Jour. Indian Bot. 1: 252-253. 1920.—In Mundi State in the outer north-west Himalayas there is a small lake in which are 7 floating islands, formed almost exclusively of *Phragmites*, probably *P. communis*. A detailed study of the islands was not made.—Winfield Dudgeon.

102. LOWE, C. W. The flora of Warrens Landing, Lake Winnipeg, Manitoba. Canadian Field-Nat. 34: 26-30. 1920.—Warrens Landing possesses a typical muskeg covered with the coniferous trees *Picea alba*, *P. mariana*, and deciduous trees, especially poplars, willows, and birch. There is a dense shrubby undergrowth in which are many of the flowering plants typical of the North. A list of the plants found at Warrens Landing, arranged in taxonomic sequence, accompanies the ecological notes.—W. H. Emig.

103. MOORE, G. T., AND J. L. KARRER. A subterranean algal flora. Ann. Missouri Bot. Gard. 6: 281-307. 1919.—Results are reported on algal cultures prepared by inoculating sterile portions of a modified Beyerinck solution on sand with soil taken from various depths down to 1 m. Various types of soils used were from Missouri, Massachusetts, and California. It was found that "there exists a subterranean algal flora independent of the nature of the soil and locality." *Protoderma viride*, it would seem, is "especially adapted to live under subterranean conditions;" however, 13 other algae were found at a depth of at least 20 cm. "The greatest growth was never at the surface but at a depth of 5-60 cm." A detailed physiological study of *Protoderma viride* is forthcoming.—S. M. Zeller.

104. NICHOLS, GEORGE E. The vegetation of Connecticut. VI. The plant associations of eroding areas along the seacoast. Bull. Torrey Bot. Club 47: 89-117. Fig. 1-6. 1920.—The following habitat factors affecting vegetation along the seacoast are treated under influences associated with submergence in sea-water; salinity of sea-water, the tides, illumination at different depths, and temperature of sea-water. Physiographic influences, such as erosion and deposition, and atmospheric influences are also discussed. The plant associations of the eroding areas are divided into groups; those of rocky shores and bottoms include the seaweed associations of the sublittoral region, the seaweed associations of the littoral region, and the associations of the supralittoral. For shores and bottoms of glacial drift the same general divisions are made. A short discussion of succession along eroding coasts is given.—P. A. Munz.

105. SCHONLAND, S. Phanerogamic flora of the divisions of Uitenhage and Port Elizabeth. Mem. Bot. Surv. South Africa 1: 7-118. 1919.—The flora is made up of 129 orders, 716 genera, and 2312 species. The proportion of genera to species is 1: 32; of monocotyledons to dicotyledons 1: 2.6. Shore vegetation does not differ essentially from the vegetation in other similar localities along the south coast of South Africa. Halophilous meadows are particularly well developed at and near the mouth of the Zwartkops River and extend on its right bank to beyond Redhouse. The vegetation of the Van Stadens Mountains, apart from patches of thorn scrub and forests, has many features of a southwestern hill vegetation. On the coastal plateau thorn scrub is more frequent and eastern types more prevalent than on the Van Stadens Mountains. Karroid succulent vegetation occupies a large tract of country and is most typically developed in the northwestern parts. Karroid thorn scrub is not always sharply divided from the karroid succulent vegetation; numerous succulents are often mixed with it and patches of pure succulent vegetation frequently occur. Pure *Acacia* formation is not extensive and occurs in the eastern and northeastern portions. Pure grassland formation is found on a large part of the Zuurborg on the "grass ridge" east of Uitenhage and east of the Sundays

River near its mouth. Forest patches occur almost entirely in deep kloofs on the southern side of the mountains and hills close to the sea. From the phytogeographical point of view the divisions suggested by BOLUS are adopted but the eastern boundary of the southwest coast region is placed not at Van Stadens but in a line from Port Elizabeth through the Bethelsdorp hills.—*E. P. Phillips.*

106. THONE, FRANK E. A. **Pioneer plants on a new levee.**—IV. *Proc. Iowa Acad. Sci.* 25: 423-425. 1920.—The author notes chiefly the destruction of the locality described in three former papers, which describe a ruderal succession. A list of plants noted in 1917 is given.—*H. S. Conard.*

107. TRANSEAU, E. N. **Vegetation of Cape Breton.** [Rev. of: NICHOLS, G. E. *The vegetation of Northern Cape Breton Island, Nova Scotia.* *Trans. Connecticut Acad. Arts and Sci.* 22: 249-467. 1918. (See *Bot. Absts.* 1, Entry 833.)] *Plant World* 22: 145-146. 1919.

108. WAKSMAN, SELMAN A. **Fungi commonly found in soil.** [Abstract.] *Absts. Bact.* 4: 5. 1920.—“Soils, rich in organic matter, will be found to contain, if the moisture and temperature conditions are favorable, an abundant fungus growth. Soils with a low organic matter content may show a fungus growth, under special conditions which are not definitely established as yet, possibly at a high moisture content and at a relatively high temperature. The same species of fungi were found in localities as far apart as Alberta, Canada, Hawaiian Islands, Louisiana, Maine, and newly-formed soils from Tortugas Island. This tends to confirm the fact that even those fungi which have not been demonstrated to exist in a vegetative mycelial stage in all these localities, do produce a vegetative growth. When the conditions become unfavorable for the growth of these fungi, due to the climatic variations, the mycelium may be destroyed, but the spores, which are much more resistant to adverse conditions, survive, only to germinate and produce a fresh vegetative growth when conditions become favorable.”—Organisms are mentioned only by family or genus. [From author's *Abst.* of paper read at scientific session, Soc. Amer. Bact.]—*D. Reddick.*

109. YOSHII, Y. **Oekologische Studien über Vegetation der Ota Dünen.** [Ecological studies of the vegetation of the Ota dunes.] *Jour. Coll. Sci. Imp. Univ. Tokyo* 43³: 1-68. 2 pl., 8 fig. 1919.—After a bibliographical introduction and a statement of the general characteristics of dune plants, the author discusses the specific influences of position, rainfall, temperature, wind, and other climatic factors on the movement and other behavior of the sands and the plants which live on them and hold them in place.—*G. J. Peirce.*

FLORISTICS

110. BARDIE, A. **Tulipes, primevères et anémones dans le Libournais.** [Tulipa, Primula and Anemone of Libournais.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 69: 90-92. 1915-16. [Received May, 1920.]—The habitat and distribution of a few interesting plants are briefly described.—*W. H. Emig.*

111. BARDIE, A. **Le Mathiola incana et le Daphne laureola à Lormont.** [Mathiola incana and Daphne laureola at Lormont.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 84-87. 1914. [Received May, 1920.]

112. BAUDRIMONT, A. **Compte rendu de l'excursion faite a Bazas et dans les environs le 1er juin 1914.** [Report of the excursion to Bazas on June 1, 1914.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 67-72. 1914. [Received May, 1920.]

113. BOUCHON, M. **Excursion aux Quatre-Pavillons.** [Excursion to Quatre-Pavillons.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 54-55. 1914. [Received May, 1920.]

114. BOYER, G. Excursion de la Société Linnéenne, le 16 mai 1915, à la propriété Catros. [Excursion of the Linnean Society on May 16, 1915.] Actes Soc. Linn. Bordeaux Proces-verbaux 69: 29-30. 1915-16. [Received May, 1920.]

115. BOYER, G. Compte rendu de l'excursion de la Société Linnéenne à Léognan, le 27 juin 1915. [Report of the excursion of the Linnean Society to Leognan, June 27, 1915.] Actes Soc. Linn. Bordeaux Proces-verbaux 69: 31-32. 1915-16. [Received May, 1920.]

116. BRADSHAW, R. V. Rare plants of Oregon. Amer. Bot. 26: 18-19. 1920.—Notes on the occurrence of *Erodium moschatum*, *Linaria clatine*, *Centaurea nigra*, and *Cynosurus echinatus* near Eugene, Oregon.—W. N. Clute.

117. BURNHAM, STEWART H. The haunts of *Rhododendron maximum*. Torreyia 20: 28-31. 1920.—*Rhododendron maximum* L., a rare plant in New York, was found by the writer in 1904, in Michigan Hollow Swamp, between West Danby and Danby, Tompkins County, New York. About 7 distinct patches were found within a circumference of 600 feet. It is slowly spreading and in no danger of extermination. The plant is described and the associated vegetation indicated. A sketch-map showing the exact location of the station is added.—J. C. Nelson.

118. BURNHAM, STEWART H. The mosses of the Lake George flora. Bryologist 23: 17-26. 1920.—The article covers the families Sphagnaceae to Grimmiaceae (pars), and is to be continued. The author enumerates the sources of information (printed lists, collections, collectors), and attempts to give a comprehensive view of the present knowledge of the moss-flora of the region and of the work previously done. Seventy species besides many varieties are mentioned, under most of which there are detailed citations of localities or collectors.—E. B. Chamberlain.

119. BUSBY, ISABEL. A trip to Gosford. Australian Nat. 4: 125-127. 1920.

120. CHIOVENDA, E. Le piante raccolte dal Dr. Nello Beccari in Eritrea nel 1905. [Plants collected by Dr. Nello Beccari in Eritrea, 1905.] Nuovo Gior. Bot. Ital. 26: 89-114. 1919.

121. CRATTY, R. I. Notes on an introduced woodland flora. Proc. Iowa Acad. Sci. 25: 411-412. 1920.—An account of the woodland plants which appeared spontaneously in a grove in Emmet County, Iowa, which was planted in 1870 on a prairie six miles from native timber. *Liparis loeselii*, two ferns, and several shrubs are named. The locality is now mostly destroyed.—H. S. Conard.

122. C[REEL], E. Excursion to Brookvale. Australian Nat. 4: 141-142. 1920.—List of plants observed in various habitats.—T. C. Frye.

123. FAMILLER, I. Einige kritische Bemerkungen zu J. Röhl, Die Thüringer Torfmoose und Laubmoose und ihre geographische Verbreitung. [Critical remarks on J. Röhl's Thuringian mosses and their geographical distribution.] Krypt. Forsch. Bayerische Bot. Ges. 3: 187-188. 1918.—The remarks criticize or correct certain statements regarding the moss flora of Bavaria, made incidentally by Röhl. Some of these statements relate to Bavarian bryologists and their activities and others to records of Bavarian mosses.—A. W. Evans.

124. FITZPATRICK, T. J. The fern flora of Nebraska—I. Amer. Fern Jour. 10: 5-15. 1920.—The author divides the state into seven regions, discussing the geographic features and listing the species of pteridophytes found in each region. The fern flora of the state is represented by 17 genera and 26 species. An annotated list of species of Ophioglossaceae (2 genera and 3 species), Osmundaceae (1 genus and 2 species), and Polypodiaceae (1 species) is given.—F. C. Anderson.

125. FITZPATRICK, T. J. The fern flora of northeastern Iowa. Proc. Iowa Acad. Sci. 25: 417-421. 1920.—The counties of Winneshiek, Allamakee, Clayton, and Dubuque are in

the "driftless area," with beds of Cambrian sandstones and Lower Silurian limestones and shales. Thirty-three species are recorded, including *Botrychium*, *Osmunda*, *Azolla*, *Selaginella*, and *Isoetes*.—*H. S. Conard*.

126. GRAFF, PAUL W. **Unreported ferns from Montana.** Bull. Torrey Bot. Club 47: 125-129. 1920.—*Ophioglossum vulgatum* L., *Cystopteris fragilis* (L.) Bernh. var. *angustata* (Hoffm.) Luers, *Aspidium cristatum* (L.) Sw., *A. Filix-mas* (L.) Schrad., and *A. spinulosum* (O. F. Muller) Sw. var. *intermedium* (Muhl.) D. C. Eaton are given as occurring in Montana, although not previously reported from that state.—*P. A. Munz*.

127. HAMILTON, A. A. **Excursion to Duck River.** Australian Nat. 4: 140-141. 1920.—A list of plants observed.—*T. C. Frye*.

128. HERRE, ALBERT C. **Notes on Mexican lichens.** Bryologist 23: 3-4. 1920.—A list of 23 species with localities.—*E. B. Chamberlain*.

129. JENNINGS, O. E. **Rarity of Conopholis.** Amer. Bot. 26: 29. 1920.—*Conopholis* is regarded as not uncommon in Western Pennsylvania. The plants usually occur in elevated, poor, and probably acid soils, in black, red, or chestnut oak woods.—*W. N. Clute*.

130. KASHYAP, S. R. **Distribution of liverworts in the western Himalayas.** Jour. Indian Bot. 1: 149-157. 1920.—The author brings together the experience of a number of collecting trips into various parts of the western Himalayas. Liverworts occur at altitudes ranging from 700 feet on the plains to 13,000 feet. Thallose forms predominate. The number of species and individuals increases from the plains up to about 7000 feet, then decreases with higher altitudes; they decrease also in passing from east to west. The outer ranges are richest in species and individuals, the higher middle range stands next, the inner high range has very few, while beyond the inner range there are none. The outer or southern slopes are richer than the inner ones. A total of about 75 species is recorded. Lists of species are given for the various localities; Mussoorie, 78° 5' E. Long., 30° 27' N. Lat., altitude 6-7000 feet, stands first with 42 species.—*Winfield Dudgeon*.

131. KREBS, CARL. **A rare Ohio plant immigrant.** Amer. Bot. 26: 1. Pl. 1. 1920.—*Berberis aquifolia* reported as established in the Cuyahoga Valley, Ohio.—*W. N. Clute*.

132. LLAGNET, M. **Liste des plantes récoltées à l'excursion de la fête-Linnéenne.** [List of plants collected on the excursion of the Linnean anniversary.] Actes Soc. Linn. Bordeaux Proces-verbaux 68: 83-84. 1914. [Received May, 1920.]

133. LORENZ, ANNIE. **Some Hepaticae from Matinicus Island, Maine.** Bryologist 23: 1-3. 1920.—The article lists 21 species of hepatics, and contrasts the hepatic flora of Matinicus with that of Mt. Desert.—*E. B. Chamberlain*.

134. LOWE, RACHEL L. **Rhacomitrium sudeticum, a moss new to Worcester County, Massachusetts.** Bryologist 23: 4-5. 1920.—The moss occurs on Mt. Wachusett. References are included to further New England distribution.—*E. B. Chamberlain*.

135. McATEE, W. L. **Notes on the flora of Church's Island, North Carolina.** Jour. Elisha Mitchell Sci. Soc. 35: 61-75. 1919.—The paper includes a list of seed plants, with three ferns and one alga, collected or noted during several visits in 1909 and 1918. *Ilex vomitoria* is used by the inhabitants for making tea, but they regard *Asimina triloba* as poisonous.—*W. C. Coker*.

136. McATEE, W. L. **Notes on the jack pine plains of Michigan.** Bull. Torrey Bot. Club 47: 187-190. 1920.—A general description is given of the Jack Pine Barrens with lists of some of the plants found.—*P. A. Munz*.

137. NELSON, JAMES C. A noteworthy grass. *Amer. Bot.* 26: 10-12. *Fig. 1.* 1920.—*Coleanthus subtilis* described from the mountains of Bohemia in 1816 was first observed in America at Searles Island, in the Columbia river near the mouth of the Willamette in 1875. It has since been found at Hood River, Oregon, White Salmon and Bingen, Washington. Recently (Oct. 1919) it was reported from Hayden Island opposite Vancouver, Washington, by the author. The mature plant is only a few centimeters in length and the suggestion is made that it may be a native to America frequently overlooked because of its size and lateness in appearing.—*W. N. Clute.*
138. NELSON, JAMES C. *Tilia europaea* in Oregon. *Torreyia* 20: 31-32. 1920.—A specimen of *Tilia europaea* L. about 40 feet high was found on June 19, 1919, in the Calapooia Mountains along Smith River, near Gunter, Douglas County, Oregon, apparently perfectly established, and probably a relic of cultivation by an early apiarist, although the mountain-forest was apparently unbroken.—*J. C. Nelson.*
139. PALMER, ERNEST J. The canyon flora of the Edwards Plateau of Texas. *Jour. Arnold Arboretum* 1: 233-239. 1920.—The author gives an account of the physiography of the Edwards Plateau and of the general character of its vegetation, which is xerophytic except along the water courses. Particular attention is drawn to the occurrence of *Taxodium distichum* along the lower river courses. The most remarkable feature of the flora is the presence in the upper canyons of small colonies of many species belonging to the Gulf and Atlantic coastal plain flora. These colonies are explained as relics of a former extension of the coastal plain forest across the Edwards Plateau possibly almost to the base of the Rocky Mountains. After the elevation of the region had taken place about the close of the Tertiary period, the climatic changes caused the gradual disappearance of the forest, which was replaced by the semi-desert flora of the southwest and of northern Mexico except in sheltered spots in the canyons where vestiges of the original flora persisted.—*Alfred Rehder.*
140. QUEYRON, PH. Une herborisation au Pech de Berre, près Arguillon (Lotet-Garonne). [Botanizing at Pech de Berre, near Arguillon.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 69: 26-29. 1915-16. [Received May, 1920.]
141. SOTH, MRS. BLANCHE H. Wildflower distribution in the West. *Amer. Bot.* 26: 14-16. 1920.
142. STANDLEY, PAUL C. Sphagnum in Glacier National Park, Montana. *Bryologist* 23: 5-6. 1920.—The occurrence of 4 species is noted.—*E. B. Chamberlain.*
143. TADULINGAM, C. Short notes on distribution, etc. *Jour. Indian Bot.* 1: 125. 1919.—New localities in India are recorded for *Juncus bufonius* L. and *Pyrenacantha volubilis* Hook.—*Winfield Dudgeon.*
144. VICTORIN, M. Random botanical notes. III. Isle-aux-Coudres, Quebec. *Canadian Field-Nat.* 33: 114-117. 1919.—The more characteristic plant species of various ecological regions of an island of the St. Lawrence River are enumerated. Several species of *Carex* receive special mention.—*W. H. Emig.*
145. WATERHOUSE, G. A. Report of the excursion to Narrabeen, 11th October. *Australian Nat.* 4: 127. 1920.
146. WILSON, E. H. The Liukiu Islands and their ligneous vegetation. *Jour. Arnold Arboretum* 1: 171-186. 1920.—An account of the woody plants of the Liukiu Islands is given, preceded by introductory notes on the geography, history, and population of the islands. The flora of the northern group of islands is related to that of Japan, that of the southern group to the flora of Formosa. The vegetation is characterized by the evergreen shining foliage of most of the woody plants and by the presence of Mangrove-like trees, *Cycas*

revoluta, *Pinus luchuensis*, and two palms. The flora contains according to our present knowledge 351 species and 23 varieties representing 233 genera; a considerable number of the species and most of the varieties are endemic. A systematic enumeration of the woody plants concludes the article and contains a new species, a new variety, and a new combination: *Elaeagnus liukiensis* Rehd., *Rhamnus davuricus* var. *liukiensis* Wils., and *Zanthoxylon okinawensis* (Nakai) Wils. A list of the woody plants of the Kawanabee Islands, which connect Japan and the Liukiu Islands, compiled by Ushiro is appended.—*Alfred Rehder*.

APPLIED ECOLOGY

147. NAUMANN, EINAR. Tillämpad limnologi. Några teoretiska grundlinjer för en rationell vattenkultur. [Applied limnology. Some theoretical principles of a rational water culture.] K. Landtbr. Akad. Handl. och Tidskr. 58: 199-221. 1919.—A discussion of plankton in relation to environmental conditions, methods of improvement, and utilization as fish food.—*E. G. Anderson*.

FORESTRY AND FOREST BOTANY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 48, 82, 86, 89, 422, 505, 572, 576, 688)

148. ANONYMOUS. Distillation of sandal oil. Australian Forest. Jour. 3: 316-318. 1920.—A note on the recently developed sandalwood oil industry in Western Australia.—*C. F. Korstian*.

149. ANONYMOUS. Forest trails and highways of the Mount Hood region, Oregon National Forest, Oregon. U. S. Dept. Agric. Dept. Circ. 105. 32 p., illus. 1920.

150. ANONYMOUS. Ironbark versus jarrah. Australian Forest. Jour. 3: 239. 1920.—A note on a test conducted by WARREN of Sydney University to determine the comparative strengths of New South Wales *Eucalyptus paniculata* and *E. marginata*. As a result of a simple cross breaking test the former (iron-bark) proved the stronger of the 2 species.—*C. F. Korstian*.

151. ANONYMOUS. A mountain vacation land. U. S. Dept. Agric. Dept. Circ. 132. 10 p., illus. 1920.

152. ANONYMOUS. A new textile from the bark of the "silkworm mulberry." Sci. Amer. Monthly 2: 152. 1920.

153. ANONYMOUS. Snöbrott och topröta hos granen. [Snow breakage and top rot in spruce.] Skogsvårds Föreningens Tidskr. 17: 173x-181x. 1919.—The article reports a discussion by Swedish foresters of an address on the above subject by T. LAGERBERG at the annual meeting of the association, March 15, 1919.—*G. A. Pearson*.

154. ANONYMOUS. A thinning area re-visited. Australian Forest. Jour. 3: 251-254. 1920.—A brief discussion of the failure of the seedling crop in rather heavily thinned stands of *Eucalyptus*, which is attributed to: (1) Heavy grazing and rabbit injury in dry years, the latter being the principal cause of the damage, leaving the forest dependent on coppice for regeneration; (2) removing all mature standards and not leaving seed trees, the immature standards being too young to produce seed; and (3) the absence of humus, which is regarded as a minor cause.—*C. F. Korstian*.

155. ANONYMOUS. **The timbers of commerce.** [Rev. of: HOWARD, A. L. *A manual of the timbers of the world, their characteristics and uses.* xvi + 446 p. Macmillan and Co.: London, 1920.] *Nature* 106: 80-81. 2 fig. 1920.—“Mainly a descriptive account of the commercial uses. . . . practically confined to those imported into London and Liverpool. . . . book, in short, is excellent on the commercial side.”—O. A. Stevens.

156. ARENS, P. **Ziju aan het tappen met driptris voordeelen verbonden?** [Does tapping with driptins give any advantage?] Mededeel. Proefsta. Malang [Java] 25. 1-16. 1919.—Reprinted from the Arch. Rubbercult. 3: 36-41. 1919.—Carl D. La Rue.

157. BENNETT, H. C. **Progress report of forest administration in Coorg for 1918-19.** 27 p. Bangalore, British India, 1920.—An annual report with appended tabulated data. The reserved forests now total 520 square miles. The proportion of total forest area open to cattle increased from 71 to 86 per cent and the number of animals grazed increased from 2985 to 13,376. All spike experiments with sandal by burning the area have given negative results with one exception where a tree was found to have become spiked by this treatment. Owing chiefly to reduction in output and decrease in price of sandalwood the revenue of the province fell below that of the previous year.—E. R. Hodson.

158. BLUNT, A. W. **Progress report of forest administration in the province of Assam for 1918-19.** 59 p. Shillong, British India, 1919.—An annual report covering in some detail all forest operations. At the end of the year the total area of the reserved forests of the province was 5495 square miles representing a net increase in the last five years of 1,114 sq. mi. Owing to reservation of forests and the extension of cultivation, the area of unclassified State forests was reduced by the close of the year to 10,050 sq. mi. The total decrease during the last five years was 2092 sq. mi. A systematic division of waste lands into those suitable and those unsuitable for reservation, which will greatly help in establishing a definite scheme of reservation, is now being made. During the last five years the annual surplus has averaged 450,516 Rs. The forest devastation caused by sugarcane cultivation is noted. “It is the most destructive of all forms of shifting cultivation, and after a crop of sugarcane has been taken off an acre for 3 or 4 years in succession nothing will grow except weeds and hardy shrubs like the *Eupatorium oderatum*.” A species of *Peridermium*, closely allied to *P. cerebrum* Peck, is attacking *Pinus khasya* but is confined to elevations over 5500 feet. A report was submitted on the damages caused by floods and protection of catchment areas at the head-waters of rivers, but action has been postponed until the services of a special officer become available. The usual formal tabulated summaries are appended and a map of the province is included.—E. R. Hodson.

159. BOAS, I. H. **The manufacture of alcohol from waste wood or sawdust.** Australian Forest. Jour. 3: 269-270. 1920.—The development of this industry is traced especially with reference to conditions in America.—C. F. Korstian.

160. CARLETON, M. B. **The soap nut tree.** Amer. Forestry 26: 621. 1 fig. 1920.

161. DACY, G. H. **Where willow ware comes from.** Sci. Amer. 123: 222, 235. 5 fig. 1920.—How the willow tree is grown and tended to yield the raw materials of furniture and basket factories.—Chas. H. Otis.

162. DIEDEN, HENRIK. **Om Skögsförhållandena på Island.** [Forest conditions in Iceland.] Skogen 6: 293-300. Fig. 1-7. 1919.—About 1000 years ago when Iceland was colonized by the Vikings large portions of the island were forested. The forests, however, were gradually destroyed by cutting and fire followed by drifting sands, while sheep grazing prevented or at least greatly interfered with reproduction. At present 500 square kilometers are classified as forest land, but of this only 500 hectares are forested. Practically all lumber is now imported from Sweden and Norway. High prices incident to transportation charges have necessitated the use of all kinds of wood substitutes for fuel and construction. Steps are now

being taken to re-establish the forests by planting (mainly experimental) and by fencing partially wooded areas against sheep. Only the native birch and possibly Siberian larch give promise of success in forestation. Exotics planted at the experiment station at Aukureyri have not proved satisfactory. Failure is attributed primarily to a moisture deficit brought about by the combined action of a fine impermeable soil and excessive transpiration due to high winds.—*G. A. Pearson.*

163. GIBSON, A. J. Development of turpentine industry in Germany during the war. *Indian Forester* 46: 525-531. 1920.—A short review of a number of papers given in the bibliography (17 titles) covers in a general way the development of the industry in Germany.—*E. N. Munn.*

164. GILL, WALTER. Fire protection. *Australian Forest. Jour.* 3: 199-201. 1920.—A paper read at the Hobart Forestry Conference. The author discusses the subject of fire protection in Australia under the following heads: (1) Fire-breaks, (2) fire-towers, (3) telephones, (4) fire-fighting equipment.—*C. F. Korstian.*

165. GRAVES, HENRY S. The Northern Pacific Railway or the nation—which? *Jour. Forestry* 18: 675-680. 1920.

166. HATTON, JOHN H. Live-stock grazing as a factor in fire protection on the national forests. U. S. Dept. Agric. Dept. Circ. 134. 4-11, pl. 1-5. 1920.

167. HAY, R. D. Report of the forestry commission for year ending June 30, 1920. 34 p., *Illus.* Sydney, New South Wales, 1920.—A revised scheme of forest management requiring stricter regulation and control over forest working, more complete and systematic utilization of timber and other forest products and payment therefor, has been established. In some cases the Commission had to undertake the felling and direct conversion of standing timber to remedy wasteful practises. A training school for forestry students was opened with seven students during the year.—The State forests now total 5,085,050 acres. *Zamia* palm (*Macrozamia spiralis*) was investigated as a source of industrial alcohol, the bulbs yielding 13.3 gallons per ton and 8.19 per cent starch. Mountain ash (*Eucalyptus gigantea*) excelled other timbers for airplane construction. Mountain gum (*E. dalrympleana*), blackbutt (*E. pilularis*), and spotted gum (*E. maculata*) are to be tested on a commercial scale for paper pulp value, as these species can be supplied in fair quantity in connection with the working and silvicultural treatment of the State Forests. Mangrove is important in oyster culture and in protecting foreshores from erosion; but owing to the difficulty of supervision, the areas below high-water mark are being turned over to fishery officials.—*E. R. Hodson.*

168. HELMS, J. Egene i Silkeborgegnen. [The oaks around Silkeborg.] *K. Veterinaer og Landbohøjskole Aarsskr.* 1920: 197-222. Fig. 1-18. 1920.—In Denmark *Quercus pedunculata* is the common species, and only in northern Jutland is *Q. sessiliflora* found to any extent, where it is planted only as a part of the original natural forest. Hybrids of the two species are also found. From 1820 to 1905 only small quantities of the two species were planted, but in latter years larger areas have been laid out with oak. The remaining old oaks in the Silkeborg forests cannot be regarded as typical of the original oak forest; they have been left because of their bad form or inaccessibility. Although the wood is injured by frost cracks, and the young leaves by late frosts, *Q. sessiliflora* is better adapted for the locality than the other species.—*Ernst Gram.*

169. HOWARD, S. H. Poisoning *Bauhinia vahlii*. *Indian Forester* 46: 562-572. 1920.—A number of poisons variously applied were tried to develop an effective method of killing climbers. The results were rather inconclusive. However, one application of mercuric chloride or sodium arsenite to the cut and split ends sufficed to kill the climbers. Root sprouting does not seem to be prevented.—*E. N. Munn.*

170. JOHNSON, F. R. **Forests in the sand hills.** Amer. Forestry 26: 582-584. 4 fig. 1920.—One of the first forest plantations in western Nebraska was established in 1891. Jack, Scotch and yellow pine were used, with good results. In 1903 a plantation was established with jack pine seedlings from the forests of Minnesota. These trees are now 20-25 feet in height and forest conditions prevail. Nurseries with a large annual output have been established. Western yellow pine (*Pinus ponderosa*) and jack pine (*Pinus divaricata*) are best adapted to this region. Three-year old transplants are used and planted in furrows. Method of planting and special tools used including the "trencher," are discussed. Fire protection has been very effective, fire lines a rod wide dividing the plantations into units of about 160 acres.—Chas. H. Otis.

171. JUDD, C. S. **The first algaroba tree in Hawaii.** Amer. Forestry 26: 605-606. 2 fig. 1920.—The characteristics and uses of *Prosopis juliflora* DC. are discussed.—Chas. H. Otis.

172. KRAUCH, HERMANN. **The use of stand graphs in determining the limitation of cut.** Jour. Forestry 18: 719-722. 1 fig. 1920.—To properly mark a stand for cutting rate of growth and volume on the ground should be known, but unless the marker keeps a record of the cut and what remains, there is no way to determine the amount left on the ground. A method of determining the safe diameter limit and how much remains on the ground is described. Charts show the per cent of trees of each diameter class on a sample plot and the per cent of the volume in each of these classes for each species. When the final stand is decided upon, by using these percentages, the volume to be cut may be arrived at by cutting each species to a diameter limit.—E. N. Munns.

173. LAGERBERG, TORSTEN. **Snöbrott och toppröta hos granen.** [Snow breakage and top rot in spruce.] Meddel. Statens Skogsförsöksanst. 16: 115-162. Fig. 1-11. 1919.—Working plans are often seriously disrupted by snow damage. The calculated annual yield may be greatly increased by the salvaging of fallen or badly injured trees. Even uninjured trees must sometimes be cut in order to save them from windfall or drought. Until recently it has been a difficult problem to decide what character and degree of damage is permissible in trees which are left. The present investigation shows that broken stems are almost invariably attacked by rot, and therefore should be removed from the stand. The rot progresses more rapidly in rapidly growing than in slow growing trees. Callus and exudations from the wound may delay and in rare cases prevent infection.—G. A. Pearson.

174. LANE-POOLE, C. E. **Report of the Forests Department for the year ended 30th June, 1920.** Ann. Progress Rept. Forests Dept. Western Australia. 30 p. Perth, 1920.—The work of the Department for the fiscal period is briefly summarized under the following captions: "Classification of forests, reservations, forest work, forest ranging and timber inspection, plantations and nursery work, timber industry, kiln drying, firewood, mining timber, revenue and expenditure, botanical, entomological, tan barks, commonwealth forest products laboratory, sandalwood, kingia grass tree fiber industry, regulations, interstate forestry conference, publicity and staff." The total area classified to date amounts to 3,550,000 acres. A start was made in the preparation of two preliminary working plans. Western Australia is awakening to the possibilities of kiln drying. The overcutting of the sandalwood supplies of the State is causing considerable concern. The organization of the Department was delayed through the impossibility of obtaining the necessary staff. The report is appended by detailed statements of revenue and expenditure; production of mill timber and lists of concessions; leases; sawmill, hewing, firewood, sawmilling, and miscellaneous permits; herbarium specimens collected and identified; trees grown and planted at the Hamel State Nursery; forest insects in the departmental collection; and particulars of prosecutions during the year.—C. F. Korstian.

175. LEAVITT, CLYDE. **The British Empire forestry conference, 1920.** Jour. Forestry 18: 669-675. 1920.—Foresters from twenty-three countries in the British Empire met in July, 1920 and decided upon a definite plan of action. Some of the more important measures to be

put into effect in each of the countries are: (1) The adoption of a forest policy enforced by foresters; (2) a survey of the resources of which there is no definite knowledge at present; (3) the development of a personnel to handle forestry matters under constitutional authority; (4) organization of forest industries; (5) education and publicity; (6) distribution of free plants for tree planting; (7) development of forest research by the states; (8) the establishment of a forestry bureau.—*E. N. Munnis*.

176. LEE, YIN KUNG. [A comparative study of Chinese and Japanese forestry.] *Khu-Shou* [Science-Publ. Chinese Sci. Soc.] 5: 832-841. 1920.—The author presents a comparison of the present state of forestry in China and Japan, and discusses fully forestry administration and management in the two countries.—*Chunjen C. Chen*.

177. MAAS, J. G. J. A. Een duffelmes voor het maken van Hevea plakoculaties. [A double knife for making patch buddings on Hevea.] *Mededeel. Alg. Proefsta. A. V. R. O. S.* [Medan, Sumatra] Rubberserie 23. 1919.—A reprint from *Arch. Rubbereult.* 3: Alg. Gedeelte 73-75. 1919.—*Carl D. La Rue*.

178. MAAS, J. G. J. A. A. Gewijzigde methode voor veldproeven bij Hevea. B. Nog eenige keimproeven met Hevea zood. [A. Other methods for field experiments with Hevea. B. Further germination trials with Hevea seed.] *Mededeel. Alg. Proefsta. A. V. R. O. S.* [Medan, Sumatra] Rubberserie 19. 1919.—A reprint from *Arch. Rubbereult.* 3: 233-245. 1919.—*Carl D. La Rue*.

179. MAAS, J. G. J. A. Vegetatieve voortplanting von Hevea brasiliensis. [Vegetative reproduction in Hevea brasiliensis.] *Mededeel. Alg. Proefsta. A. V. R. O. S.* [Medan, Sumatra] Rubberserie 20. 1919.—A reprint from *Arch. Rubbereult.* 3: 280-312. 1919.—*Carl D. La Rue*.

180. MACKAY, H. Forestry in Victoria. *Australian Forest. Jour.* 3: 212-215, 246-248. 1920.—The present are the fourth and fifth (concluding) installments of this paper. Coniferous plantations in southeastern Australia are considered with special reference to the relative merits of different species. *Pinus radiata*, *Pinus laricio*, *Pseudotsuga taxifolia*, *Picea sitchensis*, and *Pinus ponderosa* are discussed quite extensively. Mention is made of the climatic effect of tree denudation and the establishment of a forest school at Creswick.—See also *Bot. Absts.* 6, Entry 1038; 7, Entry 133.—*C. F. Korstian*.

181. MAYES, W. Progress report on forest administration in the Punjab for 1918-19. 133 p., 1 map. Lahore, British India, 1919.—At the end of the year the forest areas in square miles were: Reserved, 1747; protected, 4169; unclassified, 767; leased, 361. Fire devastated 3.17 per cent of the total area. In the irrigated plantations 1575 acres were sown, bringing the total area to 6123 acres. The cut of timber during the year in cubic feet was 7,243,000, and of firewood 27,158,000. At the Jallo factory 28,778 Maunds (maund = 80 pounds) of resin were distilled as compared with 16,426 in the previous year. The surplus fell from 934,704 Rs. the previous year to 568,472 Rs., due largely to cancellation of war contracts. It is stated that the time has now come for developing the hill forests by intensive management and working to the utmost capacity the irrigated plantations in the plains. Further postponement of this development is no longer desirable. At present the greatest needs of the department are an increased staff and an extended use of mechanical appliances for extraction coupled with improved communications. Staff is needed especially for the revision of working plans, the application of specialized engineering methods, investigation and opening of new markets, development of new industries, and for research work in silviculture and forest economics. In Bashahr the produce of thinnings, formerly unsalable, is being profitably exported. In the Pabbi, natural reproduction of *Prosopis glandulosa* continues to be good, but other species were mostly killed by drought. Spruce timber suitable for airplane manufacture is not likely to be obtainable from Bashahr, as it is too knotty and the river Sutlej and its tributaries are so rough that the driving of long scantlings is difficult. Kulu is a promising source of supply, as the driving conditions there are much better. Experiments (as with ban

oak in Kangra) have shown that *Acacia modesta* in Jhelum and Rawalpindi can be coppiced at any season of the year without trimming the stumps. In Lahore it is found that shisham seed collected from coppice is as good for cultural purposes as that from seedling trees. While difficult, an attempt will be made to control the shisham fungus by the use of watering trenches instead of flooding the whole area. Yield tables have been completed in Kulu during the year for deodar, blue pine, Chil, and fir. From ten years' observations and experiments it is concluded that the shelter-wood compartment system is the best method of insuring the regeneration of the coniferous forests of Kulu, and this system is therefore being adopted in the new working plan for the locality. European larch is doing well experimentally in Kulu. Various species of *Eucalyptus* in the Simla hills in experimental plantings still give no encouragement. The time seems at hand for appointing a Utilization Conservator (as in the United Provinces) for the Punjab to be the business head of the Department and control all its timber works, the sale of timber, the resin industry, and be in charge of the development of new markets and industries. The Government of India is considering co-operation of the Punjab with the North-West Frontier Province and Baluchistan with this idea in view, and also a plan of administrative reorganization.—*E. R. Hodson.*

182. PALMER, ANDREW H. Economic results of deficient precipitation in California. Monthly Weather Rev. 48: 586-589. 1920.—Because of markedly deficient precipitation in northern and central California during the past 4 rainy seasons serious loss resulted during the dry season of 1920. Streams reached the lowest stages on record. The Sacramento River at Sacramento fell below mean sea level, and the current of the stream was reversed. The saline waters of San Francisco Bay encroached upon rich agricultural lands of the delta region, reducing the vegetable crops, driving the dairy industry to other regions, and threatening irreparable damage to alluvial soils through the infiltration of salt water. The teredo, or "ship worm," a minute salt-water organism, did great damage to wooden structures. The average yield per acre of many crops was reduced in 1920 because of deficient moisture. Rice growers felt the drought keenly, because of the large water requirements of rice. Hydroelectric power shortage resulted in power restrictions and higher rates. Wells went dry because of the lowered level of ground water. Forest fires were more frequent and destructive than in past years, owing to the parched condition of the forests.—*Author's abstract.*

183. PEARSON, R. S. The utilization of bamboo for the manufacture of paper pulp. Indian Forester 46: 547-561, 603-631. 2 pl. 1920.—The supply of pulp woods is getting lower throughout the world and the price and demand are rising. Paper companies are now turning to plants other than trees and the bamboo has been found to be suitable for ground and sulphite pulp. Data are given on the probable yields, costs of extraction, location of mills, etc., for the various localities in India where pulp material exists in sufficient quantity to warrant the establishment of pulp mills.—*E. N. Munns.*

184. PEMBERTON, C. C. Living stumps of trees. Amer. Forestry 26: 614-616. 6 fig. 1920.—There are instances of stumps of cut trees which do not die, and which retain their vitality to a surprising extent and apparently without the aid of foliage. It is concluded that the union or indirect grafting of roots of the cut stump with those of living trees standing adjacent accounts for the phenomenon.—*Chas. H. Otis.*

185. PERROT, EM. Notes biologiques sur les Acacias fournisseurs de gomme, dite arabique, au Soudan égyptien. [Biological notes on the Acacias producing gum arabic in Egyptian Sudan.] Compt. Rend. Acad. Sci. Paris 171: 253-268. 1920.—The method of making the incision is described as is also the process of healing. The season for flowing is from May to October.—*C. H. Farr.*

186. PETRIE, W. B. Effect of cultivation on tree growth. Australian Forest. Jour. 3: 231. 1920.—A note on the increased growth of *Agathis robusta* and *Grevillea robusta* due to cultivation.—*C. F. Korstian.*

187. PETRINI, SVEN. Några sympunkter på variations—och korrelationsräkningar. [Notes regarding variation and correlation calculations.] Skogsvårdsföreningens Tidskr. 17: 238x-243x. 1919.—A reply to criticisms by L. MATSSON MÅRN of Petrini's investigations on the use of the "form-point" method in determining form-class and volume.—G. A. Pearson.

188. PETRINI, SVEN. Formhöjdstillväxten i tallbestånd inom Västerbottens Län. [Increment per cent of the form-height in pine stands in Sweden.] Meddel. Statens Skogsförsöksanst. 16: 184-187. Fig. 1. 1919.—Volume increment per cents are calculated from the basal area increment per cent and the "form-height" increment per cent. The latter term expresses the product of height and form factor. If tables of "form-height" increment per cent are available the increment per cent may be ascertained by merely measuring diameters. JONSON has prepared such tables for pine in middle Sweden. Petrini, following JONSON's procedure, has prepared similar tables for northern Sweden, where the pine has a different form. The method which is briefly described involves the measurement of heights and the determination of "mean form class" by means of the "form-point" and JONSON's function between "form-point" and "form-class."—G. A. Pearson.

189. PETRINI, SVEN. Om formpunktsbedömning. [The "form-point" as an expression of trunk-form.] Meddel. Statens Skogsförsöksanst. 16: 164-183. Fig. 1-5. 1919.—The investigation aims to test the accuracy of JONSON's "form-point" method of estimating volume and taper when applied to different stands and individual trees, and also the variations in results obtained by different persons. Estimates were made on 54 sample plots each having an area of 0.6 acre. On 10 of the plots the "form-point" was determined by 6 different persons. Estimates for single stands show an average deviation of ± 4 per cent of the height of the tree. The average personal error for a stand was 1.17 per cent. Estimates of individual trees by different persons varied as much as 10 per cent. The author concludes that the "form-points" of single trees can not be estimated with any great degree of accuracy, but that the average "form-point" of a stand can be satisfactorily determined.—G. A. Pearson.

190. PINCHOT, G. Pennsylvania chestnut trees to be sold to save timber left by blight. Amer. Nut Jour. 12: 91. 1920.—For the last 15 years all efforts to control blight have failed. The removal of trees for use as timber is proposed.—E. L. Overholser.

191. RAO, B. I. SHAMA. Note on the artificial raising of bamboos in the Akola division of the Berar Circle, C. P. Indian Forester 46: 518-525. 1 pl. 1920.—Bamboo has been successfully introduced by sowing and planting in the Central Provinces. Watering and cultivation are helpful to both seedlings and transplants, but the latter may succeed with little outside assistance if under a high cover as in the forest. Grazing and fire are destructive and must be prevented in areas recently planted.—E. N. Munns.

192. RICHARDS, EDWARD C. M. Forest conditions and primitive forest practice in West Persia. Jour. Forestry 18: 710-718. 1920.—Zoroastrianism, or fire worship, before the Moslem conquest of Persia is responsible for great ash heaps where the ancient Parsees kept the eternal fires of their shrines burning, and these ash heaps are probably the remains of the former forest. Though the people are dependent on the water supply to keep their lands productive, the lack of a forest cover in the mountains is not appreciated and crop failures and famines are frequent. Fuel woods are scarce and nearly all bushes and weeds are gathered for fire. In scattered places and at considerable distances from habitations, junipers, almonds, and haws were found growing naturally without irrigation. Poplar is the chief tree and is kept trimmed down to a small top so that it forms a long slender pole. The wood is the chief supply of the country. Willows growing along water courses are used for fuel and water pipes. Pollarding and coppicing is the rule, cutting every three years. Other trees of value are the plane, elm and walnut. Persia is in great need of forestry but the political situation is such that it is as yet far off.—E. N. Munns.

193. SABROE, AXEL S. *Flaadning i Siam och Japan*. [Log driving in Siam and Japan.] Skogsvårdsföreningens Tidskr. 17: 281-304. Fig. 1-13. 1919.

194. SALISBURY, E. J. [Rev. of: BAKER, R. T. *The hardwoods of Australia and their economics*. xvi + 522 p., 134 colored pl., 192 fig. Dept. of Education: Sydney, 1919.] Sci. Prog. [London] 14: 689-691. 1920.

195. SALISBURY, E. J. [Rev. of: HICKEL, R. *Graines et plantules des arbres et arbustes indigènes et communément cultivés en France*. (Seeds and seedlings of trees and shrubs indigenous and commonly cultivated in France.) Part I. Conifers. 182 p., 93 fig. Part II. Angiosperms. 349 p., 2 pl., 85 fig. Published by the author: Versailles, 1911 and 1914; received 1919.] Sci. Prog. [London] 14: 691-692. 1920.

196. SHERRARD, E. C., AND G. W. BLANCO. *The preparation and analysis of cattle food, consisting of hydrolyzed sawdust*. Jour. Indust. Eng. Chem. 13: 61-65. 1921.—Sawdust is hydrolyzed with 1.8 per cent sulphuric acid for 15 or 20 minutes under a steam pressure of 120 pounds. The resulting liquor is neutralized and evaporated under reduced pressure to the consistency of a thick syrup. The syrup is mixed with the sawdust residue and dried.—*Henry Schmitz*.

197. SINTUREL, E. *La forêt de Fontainebleau de 1789 à 1794*. [The forest of Fontainebleau from 1789 to 1794.] Rev. Eaux et Forêts 58: 218-226, 255-263, 281-288. 1920.—See Bot. Absts. 7, Entry 708.

198. SPARHAWK, W. N. *Suggestions for rating risks in forest insurance*. Jour. Forestry 18: 701-709. 1920.—Fire insurance rates for forests should be determined along lines similar to those followed in other kinds of insurance, an outline of which is given. The damage by a forest fire depends on the area burned and the relation between values before and after the fire. Area depends on the number of fires, and the number of the contributing causes. The area burned per fire depends on climate and type as well as inflammability, as do also the values at stake and destroyed. A classification of forest risks is suggested based on climate, on forest types, on age groups, on inflammability, and on occurrence. The loss costs may then be determined by a method similar to that employed in the ordinary form of insurance and it should take but a short time to determine these losses if all agencies cooperate for a few years.—*E. N. Munns*.

199. STARTE, H. W. *Anjan (Hardwickia binata) coppice*. Indian Forester 46: 641-647. 1920.—The best season for coppicing this species is between August and November, the worst from May to July. The height of the stump influences the reproductive power, 12 to 18 inches furnishing the strongest shoots and below 12 the weakest.—*E. N. Munns*.

200. STARTE, H. W. *Further experiments in Salai (Boswellia serrata) tapping in the Shirpur east range of N. Khandesh Division*. Indian Forester 46: 578-580. 1920.—Trees with green bark yield more gum-oleo-resin than dry-barked trees; those with short boles yield less than those with long boles; and hollow trees yield more "drip" than sound ones though the total yield is less. Heaviest yields were secured in the dry season and the best in the fourth month after tapping.—*E. N. Munns*.

201. SUDWORTH, GEO. B. *Unique example of the propagation of sugar maple from a cutting*. Amer. Forestry 26: 625. 2 fig. 1920.

202. SWAIN, E. H. F. *The financing of forestry*. Australian Forest. Jour. 3: 279-283, 300-305. 1920.—A paper read at the Hobart Forestry Conference. The insolvency of forestry in Australia, the responsibilities of the Australian Forest Services, timber imports, the colossal post-war timber requirements, financial reform, proper selling methods, efficient forest organization including adequate finances, the subsidizing of forestry and the need for an effective timber tariff are treated, followed by a round-table discussion.—*C. F. Korstian*.

203. SYLVEN, HELGE. Skogsvårdsförhållandena i Nordamerikas Förenta Stater och dess skogars framtid. [Forestry and the forest outlook in the United States of America.] *Skogen* 6: 257-271. Fig. 1-10. 1919.—The article gives a survey of the country's original and present timber resources; it rehearses the well known story of forest devastation which has led to the present agitation for a national forest policy. The provisions of the policy proposed by the U. S. Forest Service are outlined. Considerable space is given to the organization of the Forest Service. The author welcomes the entrance of the U. S. A. into the field of forestry as an important step toward the welfare, not only of the country itself but of the entire world. Expression is given to the idea that the forest question before the industrial world is no longer one of commercial competition, but how best to meet the problems of production, distribution, and utilization with a view toward supplying the needs of all countries. It is prophesied that the United States will rapidly take a place among European nations in the practise of forestry once the control of forest affairs is placed in the hands of the American foresters, to whose ability and enthusiasm he pays a high tribute.—G. A. Pearson.

204. TOUMEY, J. W. Reshaping our forest policy. *Sci. Monthly* 12: 18-35. 1921.—The failure of the U. S. A. to retain control of the forests and the consequent exploitation by private owners without reference to continuation of the forest has resulted in an acute situation. The lumberman and paper manufacturer, as well as the forester, are beginning to realize the necessity of a change, especially in view of the increasing prices of forest products. —Three leading policies are now before the country: (a) The program of the committee of the Society of American Foresters; (b) the program of the American Paper and Pulp Association and various lumber interests; (c) the program of Colonel H. S. GRAVES, former Chief of the United States Forest Service. These do not differ in desired results, but in methods of attaining them. The first proposes that laws be enacted by Congress imposing severe penalties on private owners who do not organize their property and practise forest renewal. The second insists that through co-operation and financial support the nation and the states make sustained yield on privately owned forests attainable without loss to the owner. The last urges that the state enforce mandatory regulations and provide adequate assistance in co-operation with the National Government to make forest renewal certain. Under this plan federal legislation would control extension of national forests, co-operate with the states in forest protection and silviculture and have control over such questions as forest taxation and insurance, loans on growing timber, land classification, forest surveys. State legislatures would enact laws holding private owners responsible in case of forest devastation. This plan would necessitate effective measures for organization, police regulations for fire control, effective disposal of slash in all cutting operations, establishing cutting methods suited to each forest type, etc.—L. Pace.

205. TURNER, E. P. Report of forestry department of New Zealand for year ending March 31, 1920. 36 p. Wellington, New Zealand, 1920.—An annual report covering all forest operations. During the last session of the General Assembly the State Forests Act of 1908 was amended to provide for the proclamation of national-endowment lands as provisional state forests. 3,311,000 acres of Crown lands and 56,066 acres of national-endowment lands were proclaimed provisional State forests during the year under recent legislative enactments. While largely forest of a protective character, a considerable area carries forest of present value for milling. The use of firewood for domestic purposes requires encouragement in every reasonable way. Coal is increasing in value and its use should be confined to those purposes for which firewood is not a satisfactory substitute. Approximately 11,724,000 trees were raised in the four State nurseries the past year; 3,710,900 were sent to various plantations and 277,235 to farmers and local bodies. A valuable and exhaustive report by Sir D. E. HUTCHINS on the forests of the North was published during the year.—E. R. Hodson.

206. WIMBUSH, A. Prolific growth of root-suckers in *Dalbergia latifolia*. *Indian Forester* 46: 573. 1 pl. 1920.—Roots cut off at a depth of four feet send up strong shoots from that portion not connected with the parent tree.—E. N. Munns.

207. ZON, RAPHAEL. The outlook for extending American lumber trade in Italy. Jour. Forestry 18: 723-730. 1920.—Prior to the European war, the Italian forests were being greatly overcut in spite of heavy importation from other countries. During the war, the home forests were badly depleted and injured by indiscriminate and heavy cutting. Italy now finds herself with new provinces with new sources of wood supply; but with the need of recuperation in her own forest area and the increased demand, Italy will need much additional lumber. The price of lumber in America and the prevailing exchange rates prevent this country from furnishing much of a supply; but the new countries around the Mediterranean should be able to supply much of the demand.—*E. N. Munns.*

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 29, 47, 53, 74, 371, 375, 383, 506)

208. ALMQUIST, ERNST. Studien über *Capsella bursa-pastoris* (L.). II. [Studies on *Capsella bursa-pastoris* L. II.] Acta Horti Bergiani 7: 41-95. 16 fig. 1921.—Describes 200 species of *Capsella bursa-pastoris* based on the constancy of differentiating features when grown for two or three generations in the experimental garden. Unlike the author's earlier study in this genus, in which the classification was based chiefly on foliage characters, the forms described in the present paper are distinguished chiefly on the basis of form and size of capsules. The author notes that some natural crossing occurs, and promises a further contribution dealing with crossing and mutation in this genus. He groups the species into twelve classes, named as follows: (1) *Concaviformes*, (2) *Scolioticæ*, (3) *Rubelliformes*, (4) *Corculatæ*, (5) *Cordatæ*, (6) *Otites*, (7) *Cuneolatæ*, (8) *Triangulares*, (9) *Heterocarpæ*, (10) *Lanceolatæ*, (11) *Convexæ*, (12) *Hiantes*; but these groups are not described and the figures do not allow a clear conception of their differentiating features. *Capsella apetala* Opitz, *C. integrifolia* Retzius, and *C. pinnatifida* Schlechtendal are found to occur associated with very diverse characters belonging in different groups. These are therefore not species nor constant varieties but mixtures of forms having different natural affinities.—*Geo. H. Shull.*

209. ALVERDES, FRIEDRICH. Rassenstudien an Fischen aus dem Carlsberg-Laboratorium in Kopenhagen. [Racial studies on fish from the Carlsberg Laboratory in Copenhagen.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 167-169. 1920.

210. ALVERDES, FRIEDRICH. Die Vererbung von Abnormitäten bei Cyclops. [The inheritance of abnormalities in Cyclops.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 211-278. 1920.

211. ANCEL, P. Sur l'hermaphroditisme glandulaire. [On glandular hermaphroditism.] Compt. Rend. Soc. Biol. Paris 83: 1642-1644. 1920.

212. ANONYMOUS. Families of the first born. Jour. Heredity 10: 160. 1919.—Notice of article by CARL E. JONES in Quarterly Publication of American Statistical Association for December, 1918.—*Howard J. Banker.*

213. ANONYMOUS. Genetical Society's visit to Reading. Gard. Chron. 68: 42. 1920.—Brief account of a visit of the Society to breeding and testing grounds of Sutton & Sons, Reading, England. Mention is made of crosses in dwarf beans, brassicas, marrows, sweet peas, sun flowers, etc., and this firm is stated to have one of the largest botanical collections of peas in existence.—*J. M. Shull.*

214. ANONYMOUS. [Rev. of: BATESON, W. Genetic segregation. Proc. Roy. Soc. London B, 91: 358-368. 1920. (See Bot. Absts. 8, Entry 226.)] Nature 105: 531. 1920.

215. ANONYMOUS. The inheritance of blindness. [Rev. of: BEST, HARRY. The blind: their condition and the work being done for them in the United States. 20 × 15 cm., xxi + 763 p. Macmillan Co.: New York, 1919. (See Bot. Absts. 3, Entry 231.)] Jour. Heredity 10: 211. 1919.

216. ANONYMOUS. The genetics of the Bonavist bean. [Rev. of: HARLAND, S. C. Inheritance in *Dolichos lablab*, L. Part 1. Jour. Genetics 10: 219-226. 1920. (See Bot. Absts. 7, Entry 1762.)] Gard. Chron. 69: 25. 1921.

217. ANONYMOUS. Rust resistance in wheat. [Rev. of: HAYES, H. K., JOHN H. PARKER, AND CARL KURTZWEL. Genetics of rust resistance in crosses of varieties of *Triticum vulgare* with varieties of *T. durum* and *T. dicoccum*. Jour. Agric. Res. 19: 523-542. 6 pl. 1920.] Gard. Chron. 68: 295. 1920.

218. ANONYMOUS. The vehicles of hereditary qualities. [Rev. of: MORGAN, T. H. The physical basis of heredity. 14 × 21 cm., 305 p., 117 fig. J. B. Lippincott Co.: Philadelphia and London, 1919. (See Bot. Absts. 4, Entry 422.)] Nature 106: 103-105. 1920.

219. ANTHONY, R. La pseudo-hermaphroditisme tubaire chez les Cétacés mâles. [Pseudo-hermaphroditism in the male Cetaceans.] Compt. Rend. Acad. Sci. Paris 171: 1398-1399. 1920.

220. ARPS, GEORGE F. Polydactylism and the phenomenon of regeneration. Jour. Amer. Med. Assoc. 74: 873-874. 1920.—Polydactylism is not uncommon in man and has been known since antiquity. In some places as at Eycaux, France, the trait has come to prevail in a community. In the present instance an Alabama negro soldier, 21 years old, was observed to have an extra finger on the ulnar margin of each hand. The subject, whose mental age is given as 10.3 years, reported that his father, brother, 5 sisters and 2 nieces all showed the same trait. He also affirmed that his father had the supernumerary digits removed, since which time it has "been necessary to trim them off, as they grow continuously." This (unverified) statement is advanced as evidence of regeneration.—C. H. Danforth.

221. BALLY, WALTER. Die Godronschen-Bastarde zwischen *Aegilops*- und *Triticum*-arten. Vererbung und Zytologie. [The Godronian hybrids between species of *Aegilops* and *Triticum*. Heredity and cytology.] Zeitschr. Indukt. Abstamm.- u. Vererb. 20: 177-240. 4 fig. 1919.—In 1854 GODRON in Montpellier reported on the F_1 of a hybrid, *Aegilops ovata* × *Triticum vulgare*. Later he reported that he had secured from a back-cross with wheat—the pollen parent of the hybrid—a fertile hybrid that remained constant and bred true in subsequent generations. This he called *Aegilops speltaeformis*. The author (Bally) pollinated 250 *A. ovata* flowers with *Triticum vulgare* pollen, and secured two F_1 hybrid plants. From 80 reciprocal pollinations he secured three F_1 hybrid plants. These hybrids are figured and described, the two lots of F_1 plants being similar. The pollen of the F_1 plants was sterile, being devoid of starch and otherwise not normally developed. Both wheat and *Aegilops* pollen also failed to fertilize the flowers of the F_1 plants. The cytological study revealed that *T. vulgare* has 8, *A. ovata* 16, haploid chromosomes. The number of haploid chromosomes in the F_1 hybrid of these can sometimes be determined as 12. When more than 12 appear this excess number can be explained as arising through somatic divisions of excess chromosomes of the *Aegilops* parent remaining unpaired in the diakinesis. The difference in form of the plump *Triticum* and the slender *Aegilops* chromosomes is again apparent in the reduction division of the hybrid. In the mitotic division single chromosomes arising from wheat can be recognized, and it can be shown that these in the course of meiosis can cause irregularities, and that single cells are separated which have the chromatin in their nuclei made up exclusively from that of a single parent. Another species of *Aegilops*, probably *ventricosa* (earlier thought to be *speltaeformis*) had 6 haploid chromosomes.—C. E. Leighty.

222. BANNIER, J. P. [Dutch rev. of: HAGEM, OSCAR. Einige F_2 und F_3 Generationen bei dem Bastard *Medicago sativa* \times *M. falcata*. (Some F_2 and F_3 generations of the hybrid *Medicago sativa* \times *M. falcata*.) *Nyt Mag. Naturvidenskab.* 56: 149-165. 1919.] *Genetica* 2: 535-536. 1920.

223. BANNIER, J. P. [Dutch rev. of: (1) YAMPOLSKY, CECIL. Inheritance of sex in *Mercurialis annua*. *Amer. Jour. Bot.* 6: 410-442. *Pl.* 37-40, 1 fig. 1919. (See Bot. Absts. 4, Entry 827.) (2). IDEM. The occurrence and inheritance of sex intergradation in plants. *Amer. Jour. Bot.* 7: 21-38. 1920. (See Bot. Absts. 5, Entry 502.) (3). IDEM. Sex intergradation in the flowers of *Mercurialis annua*. *Amer. Jour. Bot.* 7: 95-100. 1 pl. 1920. (4). IDEM. Further observations on sex in *Mercurialis annua*. *Amer. Nat.* 54: 280-284. 1 fig. 1920. (See Bot. Absts. 6, Entry 750.)] *Genetica* 2: 554-556. 1920.

224. BANTA, ARTHUR M. Selection in Cladocera. [Abstract.] *Anat. Rec.* 20: 212. 1921.—Some years ago the writer undertook experiments in selection in parthenogenetic pure lines of *Cladocera* on the basis of a purely physiological character, reactivity to light. Sixteen lines were subjected to selection for various periods extending over from 18 to 196 generations. In 7 of these lines no difference appeared in reactivity between the 2 strains of the same line. In 2 lines slight divergences in reactivity were in the reverse of selection. These divergences, while not large, were fairly consistent. In 1 of these cases the divergence decreased as the experiment progressed. In 5 lines there was a possible effect of selection but the evidence is not considered conclusive. In 2 lines an effect of selection is rather clearly indicated. In 1 of these the divergence was not large and this case may be disregarded. But in the other the effect of selection is very large and is clearly substantiated. The divergence in this line appeared slowly and increased gradually until during the last months of the experiment the reaction time of the low strain was less than a third that of the high strain. The difference in reactivity to light was permanent or at any rate persisted for 32 months (112 generations) after selection was discontinued. Return selection was not attempted.—A 2nd series of selection experiments based on an entirely different character is now under way. The character used is the degree of intergradedness of sex intergrade strains of *Daphnia longispina*. Derived from a common progenitor and reproducing solely by parthenogenesis this would seem a most excellent material for a study of selection. Three strains were selected as high strains and 3 as low strains, the high and low strains being taken alternately from the 6 available sister strains. Selection was effective in each case, the individuals of the high strains becoming as high (i.e., as male) as they could be maintained with fair reproductive ability; and the low strains approaching very nearly the condition in which sex intergradedness is not apparent, i.e., most of the individuals showed no sex intergrade characters and the few intergrades were slightly affected. While the facts are as stated, environmental or other factors are influential to such an extent that the curves for the different strains fluctuate somewhat. Further, selection is not effective with equal promptness in every strain though in all cases it has ultimately been effective. Return selection is also effective. Through selection low strains have been derived from the selected high strains, and high strains from the selected low strains. Two strains have in turn been selected low strains, selected high strains, and selected low strains again.—Thus selection and return selection are equally effective with the amount or degree of sex intergradedness in *Daphnia longispina*.—Arthur M. Banta.

225. BARTSCH, P. Experiments in the breeding of Cerions. *Carnegie Inst. Washington Publ.* 282. 55 p., 59 pl. Washington, 1920.—These land shells are extremely non-roving and are well adapted to breeding experiments in which isolation in different regions is a feature. Author planted four *Cerion* species from the Bahamas on the Florida keys. From several of the many colonies (usually containing 500 to several thousand marked shells) numerous first generation Florida-grown offspring have been obtained. In several cases lots of first generation offspring were transplanted and known second generation Florida-grown offspring secured. Differences in internal structural features in the different species

are pointed out and figured, but the characters utilized in comparing Florida-grown offspring with Bahama ancestry are shell characters. Differences in general coloration, mottling, and ridging of the shells are mentioned. The characters used as standards of comparison are numerical characters, numbers of whorls, altitude, and greatest diameter of the shell. A check series (100) of each of the species transplanted, and all the measured first and second generation Florida-grown offspring, are figured in plates and the individual measurements are all given in tables.—While in most of the series of first and second generation Florida-grown material one notes that the mean altitude is greater and the mean greatest diameter is less than in the original Bahama material, no great changes are seen in the means or in the ranges of variation of the characters studied. No biometrical treatment of data has been employed. The author concludes that the different species of *Cerion* seem to be quite stable within their normal limits of variation and appear to adhere to these limits even when subjected to a decidedly changed environment.—Hybrids were obtained between transplanted Bahama *Cerion viaregis* and the native Florida-key *Cerion incanum*. In shell measurements the author finds the hybrids intermediate and somewhat more variable than the parent species. In coloration, character of ridging, and general shape of shell the hybrids are extremely variable. Some are so mottled as very strongly to resemble the mottled *Cerion martensi* group; in general character of ribbing the range was from the relatively smooth *Cerion incanum* to the rough *Cerion viaregis*; the range in general form was likewise from the somewhat cylindrical *Cerion incanum* to the more conical *Cerion viaregis*. What is of even greater interest, these variations are independently combined in the hybrid offspring. Attention is called to cases in which species in a certain region are sometimes found to be extremely variable. “Prior to this year I was more and more inclined to the belief that we might possibly find that these very abundant and variable forms might represent new ingressions into a faunal area in which conditions for their existence were optimum to an unusual degree, where the normal death rate, due possibly to an absence of natural enemies, might be reduced, and where all the factors involved were inclined to favor the new arrival to the utmost, and that these factors and the necessarily reduced inbreeding might be responsible for the loosening of specific bounds and the producing of variants which, in the course of time, might result in a state of flux.—“Our *Cerion* experiments on Newfound Harbor Key, however, throw a new light upon the case, for here we have produced a *state of flux* by cross-breeding. There is no question that if we did not know the true inwardness of the *Cerion* complex as it exists at the present time in our colony upon this key, we would treat the material as we have treated such assemblages in the past; that is, as a very variable species. It therefore seems proper to assume that the converse should receive an equally favorable consideration, for it seems fair to believe that further breeding experiments will prove that such complexes are the product of cross-breeding.—A. M. Banta.

226. BATESON, W. Genetic segregation. Proc. Roy. Soc. London B, 91:358-368. 1920.—Segregation is a phenomenon which is not limited to particular classes or kinds of characters. The factors governing segregation of quantitative characters either do not segregate cleanly or the numbers involved are so large that their effects are not clearly shown. In many crosses involving quantitative characters, which appear to segregate cleanly, one or the other original type fails to reappear in its entirety. The author favors the first explanation suggested. Factor groups or complexes may sometimes segregate as units, sex determination and irregularities of inheritance in *Oenothera* are mentioned as being due to such a phenomenon. In other cases these complexes may break up and are then responsible for the appearance of mosaics of secondary sexual characters in fowls and different classes of color mosaics in the snapdragon and sweet pea. Linkage between factors conditioning the several character components of the mosaics is seldom evidenced and the question is raised if they are all distributed among different chromosomes. The author protests the general application of MORGAN's theory regarding crossing over and the limitation of linkage groups on the ground that it has been proven for only one case—*Drosophila*. The theory of linkage and crossing over has assumed much regarding the physical behavior of the chromosomes that cytology cannot substantiate. In plants the time of segregation is not limited to the reduc-

tion division as seems to be the case with animals. Cases are cited where the genetic constitutions of male and female cells of plants are so diverse that it cannot be accounted for by segregation during the reduction division. Cases of linkage values different for the male and female sex cells of the same plant are cited as exceptions to the ordinary mode of segregation. Evidence that somatic segregation may influence genetic potentialities is furnished by several citations in which root cuttings produce plants differing in some characters from the parent plant and from experiments upon rogues in peas. The author is led to believe that segregation of hereditary genes may occur at any division in the life cycle. [See also Bot. Absts. 8, Entry 214.]—*J. L. Collins.*

227. BENDERS. [Dutch rev. of: FLEISCHER, BRUNO, UND WILLIAM JOSEPHANS. *Ein Beitrag zur Frage der Vererbung der familiären Sehnerventrophie (Leberscher Krankheit).* (Inheritance of familial atrophy of the optic nerve (Leber's disease).) Arch. Rass.- u. Gesellschaftsbiol. 13: 129-158. 5 pl. 1920.] *Genetica* 2: 532. 1920.

228. BENDERS. [Dutch rev. of: GROSS, K. *Über Vererbung von Augen- und Haarfarbe und den Zusammenhang beider.* (On inheritance of eye and hair color and the correlation between them.) Arch. Rass.- u. Gesellschaftsbiol. 13: 164-170. 1920. (See Bot. Absts. 8, Entry 266.)] *Genetica* 2: 534-535. 1920.

229. BLARINGHEM, L. *Stabilité et fécondité de l'hybride Geum urbanum L. × G. rivale L.* [Stability and fertility of the hybrid *Geum urbanum L. × G. rivale L.*] Compt. Rend. Acad. Sci. Paris 170: 1284-1286. 1920.—Author pollinated *Geum urbanum* with pollen of *G. rivale*, securing an F₁ generation of 3 uniform plants. These gave seed for an F₂ generation of over 100 plants, 41 of which were used as basis of author's account. He described F₂ group as uniform and lacking Mendelian segregation and considers this crossing as exemplifying his "*hérédité mixte*" (see Bot. Absts. 4, Entry 523). There was an average of about 25 per cent of imperfect pollen grains in F₂. Author considers this hybrid type as similar to *Geum intermedium* of taxonomists.—*James P. Kelly.*

230. BLISS, A. J. *Mendelian characters in bearded Irises.* Jour. Roy. Hort. Soc. 45: 289-292. 1919.—A record of several varieties of bearded *Iris* including combinations of *variegata* and *neglecta* types that tend to show that pigmented leaf base and brown-tipped beard are Mendelian in character, possibly single unit characters. Bliss finds, however, no apparent connection between these characters and color or type of flower. A cross of *variegata* by *amoena* gave no *squalens* colors and "it almost looks as if *amoena* and *variegata* were allelomorph color varieties."—*J. Marion Shull.*

231. BONNEVIE. *Arvelighetsundersökkelser i en norsk bygdeslaegt (Polydaktyli Tvillingfödsler).* [Investigations of inheritance in a Norwegian family pedigree (Polydactyly, birth of twins).] Videnskabselskab. Kristiania Forhandl. (1918). 1919.—A considerable number of individuals in southeastern Norway have six fingers on one or both hands, and often six toes on one or both feet. Sixth finger is on side of little finger. It appears to be a dominant character through successive generations. All go back to one man from Ringebu in Gudbrandsdal in middle of seventeenth century. Twins and triplets were numerous. Twin mothers in all cases known have both parents from lines of twin-producing families, that is, character appears to be recessive.—*A. Gundersen.*

232. BONNIER, GASTON. *Sur les changements, obtenues expérimentalement, dans les forms végétales.* [On the alterations obtained experimentally in the form of plants.] Compt. Rend. Acad. Sci. Paris 170: 1356-1359. 1920.—Observations on seventeen lowland species transplanted in same soil to high stations in the Alps and Pyrenees, which have come to resemble after period of 30 to 35 years typical alpine species of same genera. Particulars are given in each case. Author discusses briefly taxonomic problems raised by these results. He holds that facts favor Lamarckian hypothesis that environmental change is one of principal causes of transformation of organisms.—*R. E. Clausen.*

233. BRAINERD, EZRA, AND A. K. PEITERSEN. **Blackberries of New England. Their classification.** Vermont Agric. Exp. Sta. Bull. 217. 84 p., 36 pl. 1920.—A comprehensive report on the classification of the blackberries in which the authors conclude "that it is no longer a question of whether or not new species of blackberries are produced in the wild through natural hybridization but rather that it is a question whether hybridization is not the primary or only factor in the production of new species within this group." A more detailed discussion of the subject of spontaneous hybridization is to be published later but some of the more important facts are enumerated which have led to the conclusion that intercrossing of different species of blackberries is of common occurrence in the wild: 1. All New England forms show more or less infertility, none having been found 100 per cent fertile, while many almost sterile forms have been grown. This infertility is due largely to the impotence of the pollen.—2. Intermediate forms between all of the well recognized species exist in the wild.—3. Wherever an intermediate between any two forms of blackberries is found the two suspected parents usually can be located.—4. Plants of the blackberry sub-genus are very variable.—5. Seeds from selfed flowers of a number of suspected hybrids have been grown and these plants, in the majority of cases, show a reversion to the suppressed parent types.—6. A number of artificial crosses have been effected between different species. The plants from these crosses are almost identical with the suspected wild hybrids.—7. In more than 30 different combinations of New England blackberries that were cross-pollinated, not one failed to produce viable seed.—The authors point out that most of the characters which distinguish the different species of blackberries are quantitative, and the hybrids, therefore, nearly always show an intermediacy in the characters which are present in varying degrees in the parents. The offspring of such hybrids do not show segregation into dominants and recessives in the ordinary Mendelian ratios but all grades of intermediates are found. In some cases (*R. permixtus*, *R. frondiscentis*, and *R. abbrevians* Blanchard) these hybrids appear to be more or less fixed.—J. H. Kempton.

234. BRIERLY, W. B. **Experimental studies in the specific value of morphological characters in the fungi.** Proc. Linnean Soc. London 1918: 55–56. 1918.—Pedigree cultures were made from single spores of *Botrytis*. The spore mode of a given culture from cabbage was found to be different when the organism was grown on tomato, and gave other modes for other substrata. A culture derived from onions when grown on cabbage differed in mode from that originating from cabbage. He concludes that the fungus consists of many elementary species or Jordanons which are morphologically distinct. He recognizes a "normal variation," present upon whatever host and characteristic of the elementary species, and a "modal" variation induced by the substratum. In nature the elementary species are usually on special hosts but saprophytically are of broad range. To determine an elementary species it is therefore necessary to isolate it and determine its "modal variation" on a series of standard media. Similar results and conclusions were had with *Penicillium* and *Stysanus*.—F. L. Stevens.

235. BROMAN, IVAR. **Das sogenannte biogenetische Grundgesetz und die moderne Erblichkeitslehre.** [The so-called biogenetic law and modern genetics.] Bergmann: München and Wiesbaden, 1920.

236. BUXTON, L. H. DUDLEY. **The inhabitants of the eastern Mediterranean.** Biometrika 13: 92–112. 1 pl. 1920.—The author deals with physical anthropology of ancient and modern Greeks, examining cephalic index, glabella-occipital length, greatest head breadth, upper facial index, nasal index, stature, and pigmentation. Significant difference in cephalic index between Lycian Greeks (80.27 ± 0.35) and those of Meligala in Messenia (82.49 ± 0.38), and of Cyprus (82.54 ± 0.11) are found; also between Cretans (79.26 ± 0.16) and Cypriots. High standard deviations indicate mixed population. Variability of Cretans dates from Middle Minoan times. Endogamous Lycian gypsies show standard deviation of cephalic index of only 2.83 ± 0.19 . There is no significant difference in coefficients of variation of head length and head breadth for the same group. For different districts head breadth is stable in Cyprus,

while head length is stable in Crete. For Crete stature of living adult males is 170.61 ± 0.26 cm. (175.26 ± 0.54 cm. for Selinos and Sphakia only); for Cyprus it is 168.77 ± 0.17 cm. Blue eyes are locally not uncommon, about 10 per cent in Albania and Cyprus, about 5 per cent in Crete. Pigmentation is apparently not definitely correlated with cephalic index. Lycian gypsies are only clear representatives of "Armenoid" race. Greeks are a mixture probably of early date of Mediterranean and Alpine types. No good ground appears for inferring Nordic blood.—*John Rice Miner.*

237. CARLE, E. Premiers travaux sur la sélection des riz du laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon laboratory for the study of cereals.] Bull. Agric. Inst. Sci. Saigon 1: 74-87. 1919.—As preliminary work to the improvement of rice in Cochín-China, an agronomic study of 700-800 varieties of rice was made, resulting in the use of those varieties with more or less round kernels as better suited for the production of the finest rice. Selection from the second generation indicates a considerable improvement in the homogeneity of the grain; also a slight increase in the tillering capacity of the plants and in the weight of the grain. Certain strains also gave much greater yields than those used as checks, but in succeeding generations it was observed that this character was not constant. By comparing the yields of all strains in the preceding generations it seems possible in the third generation to classify those which appear most constant in heavy yield. In the fourth generation a certain number of choice strains can be isolated.—*Chas. R. Chambliss.*

238. CARLE, E. Sélection pédigrée appliquée à la variété local de riz Phung-tien. [Pedigree selection applied to the local rice variety known as Phung-tien.] Bull. Agric. Inst. Sci. Saigon 2: 26-32. 1920.—Pure line selections of rice variety Phung-tien made and tested at Experiment Station at Phu-my (Cochín-China). Five best lines selected from 100 grown during first year show greater uniformity and are otherwise superior to original variety. Data on number and weight of heads are presented.—*C. E. Leighty.*

239. CARLE, E. Sélection pédigrée appliquée à la variété de riz "Nàng-Mêo." [Pedigree selection applied to the variety of rice known as "Nàng-Mêo."] Bull. Agric. Inst. Sci. Saigon 2: 73-75. 1920.—Improvement of rice variety "Nàng-Mêo" by selection is being attempted at Experimental Station at Phu-my (Cochín-China), according to methods described earlier in this bulletin (Vol. 1, 1920). Data on number and weight of heads of 4 lines for 3 years are presented. Nursery yields indicate commercial value of strains. Homogeneity of pure lines and characters differentiating them are noted.—*C. E. Leighty.*

240. COLLINS, E. J. The genetics of sex. Proc. Roy. Soc. London B, 91: 369-370. 1920.—Vegetative cultures from the monoecious moss, *Funaria hygrometrica*, made by removing the greater part of an archegonium, regenerated the typical monoecious gametophyte, unlike the vegetative cultures derived from antheridia and surrounding "perigonal leaves" of the same species which produce male plants only. Up to the point of the formation of the female organ, the cells of the haploid gametophytic phase retain the power to produce monoecious plants, whereas the leaves surrounding the male organ have lost this power.—*D. F. Jones.*

241. COLLINS, JULIUS L. Inbreeding and cross breeding in *Crepis capillaris* (L.) Wallr. Univ. California Publ. Agric. Sci. 2: 205-216. Pl. 39-41. 1920.—The naturally cross-fertilized wild plant, *Crepis capillaris*, when inbred, gives results similar to domesticated maize when so treated. The inbred plants compared with cross-bred ones show a slower rate of development during the entire period of growth. Some of the inbred strains exhibited partial pollen sterility. Complete absence of pollen was noted in one plant obtained from seed of wild plants growing in New Zealand. The maximum reduction appeared to be reached in the third and fourth generations. Inbred strains when crossed with non-inbred, produced vigorous, rapidly growing F_1 plants.—*D. F. Jones.*

242. CORRENS, C. Die Konkurrenz der männlichen und die weiblichen Keimzellen und das Zahlenverhältnis der beiden Geschlechter. [The concurrence of male and female germ-cells and the numerical relations of the two sexes.] *Naturwissenschaften* 6: 277-280. 1918.—The dioecious plant, *Melandrium*, when pollinated with a small amount of pollen gave a ratio of 737 pistillate to 555 staminate plants, and when a large amount of pollen was applied gave a ratio of 895 pistillate to 381 staminate. In the first case there were 43 per cent and in the second 30 per cent of staminate plants, showing that when the competition is keen the staminate-determining pollen nuclei are at a greater disadvantage, due to a slower growth of the pollen tubes carrying them. When the pollen is not in excess the slower-growing tubes have a better opportunity to fertilize, but even in those cases the sex ratio is not equal, a larger number of pistillate plants always resulting.—D. F. Jones.

243. CORRENS, C. Fortsetzung der Versuche zur experimentellen Verschiebung des Geschlechtsverhältnisses. [Continuation of experiments to shift the sex-ratio experimentally.] *Sitzungsber. Preuss. Akad. Wiss. Berlin* 1: 1175-1200. 3 fig. 1918.—In *Melandrium* there are ordinarily more female plants than male. The object of these experiments was to find means to alter the sex-ratio and thereby discover its determining factors. The method employed was that of varying the amount of pollen used in pollinations. There are about 350 ovules in an average capsule. When the amount of pollen applied is only slightly in excess of this number the resulting progeny shows an approximate equality of sexes (about 44 per cent males), but when a large excess (60,000 grains) is applied the proportion of males falls to about 32 per cent. This difference is about 8 times the probable error. The inference made is that there are two kinds of pollen—male-determining and female-determining—and that the second sort produces more active pollen tubes, which reach the ovules in advance of those of the male-determining sort. If a minimal amount of pollen is employed the female-producing tubes arrive first at the upper ovules and fertilize them leaving the slower male-determining ones to the lower ovules. Separating the seeds in the capsule into a lower and an upper portion confirmed this hypothesis by showing an excess of female plants from the upper seeds. It was also shown that female plants mature more quickly than males so that the proportion of males the first season was slightly lower than among the plants which lived over the winter and flowered the next season. Some experiments were also made showing that there is a differential mortality among pollen grains dried over sulphuric acid for 10 to 14 days. The male-determining appear to be weaker. Some apparently good seeds are always found incapable of further growth. Among seeds produced from old pollen this proportion is much larger, and in fact many of the embryos and ovules do not mature to the seed stage, dying at various stages.—Leonas L. Burlingame.

244. CORRENS, C. Zur Kenntnis einfacher mendelnder Bastarde. I. Die Unterscheidung der pilulifera-Homozygoten und der Heterozygoten des Bastardes *Urtica pilulifera* × *Dodartii*. II. *Mirabilis jalapa xantha* und ihre Bastarde. III. *Urtica urens peraeura*. [A contribution to the knowledge of simple Mendelian hybrids. I. Distinguishing the homozygote from the heterozygote of *Urtica pilulifera* × *Dodartii*. II. *Mirabilis jalapa xantha* and its hybrids. III. *Urtica urens peraeura*.] *Sitzungsber. Preuss. Akad. Wiss. Berlin* 1: 221-268. 1918.—Although the adult *pilulifera* homozygote and the hybrid are indistinguishable, as are also the cotyledon stages of the seedlings, yet the young plants can be distinguished by the character of the apices of the first 3 or 4 pairs of leaves. The tips of these first leaves show dominance of the *Dodartii* parent but in the later leaves the *pilulifera* parent appears to be completely dominant. As an explanation it is suggested that the *Dodartii* factor *D* becomes active earlier in ontogeny than the factor *P* which *pilulifera* has in addition to *D*, that is, *D* expresses itself only until *P* becomes active.—The *xantha* form of *Mirabilis jalapa* has only about 5 per cent as much chlorophyll as the normal (*typica*) form. *Chlorina* has about 30 per cent and *semichlorina* about 60 per cent of *typica*. *Variegata* has ground color of *chlorina* with full green flecks superposed. *Albomaculata* has leaves with white and green streaks and flecks. The amount of pigments was determined by comparison of crude alcoholic extracts of the same leaf area in some cases and of the same weight of leaves in others. *Chlorina* and *semichlorina*

show a proportional reduction of both chlorophyll and the yellow pigments. *Xantha* shows a slight increase of yellow with a large decrease of the green. *Xantha* survives only when grafted on green plants, when it sets seed. Various crosses were made with *typica*, *xantha*, and *chlorina*. The results are explicable on the assumptions: (1) That *xantha* possesses the factors ZZ for yellow pigments, (2) that *chlorina* has the formula ZZCCnn, and (3) that *typica* is NNCCZZ, where N is operative only when C is present. Four green genotypes, phenotypically alike, were identified as follows: (1) A type which when selfed gives 3 green to 1 *chlorina*, (2) a type which yields 9 *typica*: 3 *chlorina*: 4 *xantha*, (3) a type producing 3 *typica*: 1 *xantha*, and (4) homozygous *typica*. *Typica* × *chlorina* heterozygotes are only about 90 per cent as green as *typica* but heterozygotes of *typica* or *chlorina* with *xantha* are indistinguishable from the respective green homozygotes. *Urtica urens peraurea* is a yellow form which increases in green with age and is able to live independently. On account of its deficiency in chlorophyll it does not grow so rapidly nor to so great a size as the species. Selfing shows it to be a monohybrid which yields 2 greens to 1 *peraurea*. Satisfactory evidence has been secured to show that the 2:1 ratio arises through the failure of the yellow homozygote to live. A discussion is presented of the ratios to be expected in monohybrids when there is selective union of gametes, deficiency or excess of pollen, or inviable zygotic combinations.—*Leonas L. Burlingame*.

245. COULTER, MERLE C. Origin of mechanism of heredity. Bot. Gaz. 70: 459-464. 1920.—Author attempts to account for the evolutionary origin of the determiners (genes). He thinks they originated as by-products of metabolism. These by-products, he supposes, became isolated by anti-bodies and in later generations were released and induced the same kind of chemical changes as those of which they were the by-products.—*Edgar Altenburg*.

246. CROCKER, WM. Awn and barley yield. [Rev. of: HARLAN, H. V., AND S. ANTHONY. Development of barley kernels in normal and clipped spikes and the limitations of awnless and hooded varieties. Jour. Agric. Res. 19: 431-472. 1920. (See Bot. Absts. 6, Entry 1416.)] Bot. Gaz. 71: 77-78. 1921.

247. DANIEL, LUCIEN. Obtention d'une race nouvelle d'*Asphodele* par l'action du climat marin. [The appearance of a new variety of *Asphodelus* through the effect of a marine climate.] Compt. Rend. Acad. Sci. Paris 170: 1332-1333. 1920.—*Asphodelus luteus* originally obtained from Rennes has become remarkably modified after 20 years at Erquy. New form divided vegetatively and taken back to Rennes retained its acquired characters in full. Parallel sowings of seed of two forms reproduced differences exhibited by parents. Experiments are being continued. Author considers observations particularly significant for question of inheritance of acquired characters.—*R. E. Clausen*.

248. DEHORNE, ARMAND. Spermatogénèse de *Corethra plumicornis* et chromosomes eupyrrènes. [Spermatogenesis of *Corethra plumicornis* and eupyrene chromosomes.] Compt. Rend. Acad. Sci. Paris 171: 1399-1402. 1920.

249. DESMOULINS, A., ET V. VILLARD. The hybrid direct bearers in the valley of the Drome in 1919. Prog. Agric. et Vitic. (Ed. l'Est-Centre) 72: 62-65, 83-85, 114-116, 133-137. 1920.

250. DETLEFSEN, J. A. Genetic analysis of low crossover stock produced by selection. [Abstract.] Anat. Rec. 20: 211. 1921.—Following selection for low crossover values in red-eyed long-winged females (*Drosophila melanogaster*) heterozygous in white miniature, a stock was produced which has given crossover values of about 4-6 per cent for these 2 genes. The normal value used in plotting chromosome maps is 33 per cent. Matings of red long females from low crossover stock to white miniature males of normal stock gave F₁ females which show an intermediate value. When the F₁ sibs were mated inter se, the total F₂ results also showed an intermediate crossover value. However there was a distinct increase in the range of values.—Matings of red long males from low-crossover stock to eosin miniature females of normal stock gave similar results.—*J. A. Detlefsen*.

251. EAST, E. M. The rôle of reproduction in evolution. Amer. Nat. 52: 273-289. 1918.

—The rôle of methods of reproduction in evolution may be interpreted by comparing their effectiveness in offering selective agencies their raw material. Both asexual and sexual methods of reproduction occur in nearly all groups of animals and plants. In neither kingdom was sex developed as a more rapid means of multiplication; rather it fulfilled some other requirement. After origin of sex many changes in reproductive mechanisms occurred among plants, but almost all of them resulted in greater protection of the gametes, in increased assurance of fertilization, or in provision for better distribution, which may be interpreted as variations tending to perfect sexuality. Coincident with this, two important retrogressive developments occurred—apogamy and hermaphroditism—followed by evolution of methods of cross-fertilization, which seems to have been of immense advantage.—Essential evolutionary changes affecting reproduction in animals are strikingly similar to those in plants. Although asexual reproduction is found in most of the great groups of animals, it evidently did not meet all requirements since sexual reproduction is established in every phylum. Hermaphroditism is a secondary, not a primitive, phenomenon, and, as in plants, it was not found adequate. Further specialization resulted in mechanisms providing for mixtures of different germ-plasms.—Both animals and plants have adopted methods of reproduction which are identical in their essential features, something that can be said of no other life process. The significant feature is reduction of nuclear material in the gametes. This parallel evolution is of itself valid evidence of the importance of the process. For its interpretation compare sexual and asexual reproduction as an actual means for the transmission of characters. Extremely narrow variability of pedigreed inbred strains of *Nicotiana* and wheat indicate no higher heredity coefficient for sexual reproduction. Among animals it appears that the coefficient of heredity is as high for asexual as for sexual reproduction. But is this also true for germinal variation? It is believed the frequency of bud variations in higher plants propagated asexually shows that it is.—Even though there does not seem to be sufficient difference between sexual and asexual reproduction as regards variation frequency to make it a subject of experimental proof, certain theoretical points raise suspicion that there is such a difference. Parthenogenetic individuals having the haploid number of chromosomes should show proportionately more germinal variations than members of the same species having the diploid number of chromosomes, because both recessive and dominant variations should be recognizable in the former. That bud variations occur more frequently in heterozygotes than homozygotes means simply that bud variations are *detected* more frequently in heterozygotes because the majority of bud variations are retrogressive and therefore show only when the organism is heterozygous for the character affected.—The idea of MAUPAS, that continued asexual reproduction is impossible through some protoplasmic limitation, is rejected in favor of WEISMANN'S conclusion, that a mixture of germ-plasms offers sufficient advantages to account for everything, which idea finds its main argument in Mendelian heredity. If N variations occur in the germ-plasm of an asexually reproducing organism only N types can be formed to offer raw material to selective agencies. But if N variations occur in the germ-plasm of a sexually reproducing organism 2^N types can be formed. The advantage is almost incalculable. These advantages remain even though it should be shown later that the more fundamental and generalized characters of an organism are not distributed by Mendelian heredity. The majority of variations seem to be comparatively small, changes in detail, the very kind known to be Mendelian in their inheritance. The prime reason for the success of sexual reproduction is the opportunity it gives for mingling germ-plasms of different constitution and thereby furnishing many times the quantity of raw material to selective agencies that could possibly be produced through asexual reproduction.—Minor advantages accruing from asexual reproduction are, first, heterosis or hybrid vigor, which is best explained on the basis of linked dominant characters. Second, division of labor is made possible by secondary sexual characters in general, including those which separate the egg and the sperm. Finally, there is a presumable advantage in sex-linked characters, a mechanism contributing to the mixing of germ-plasms.—The essential feature of the rôle of reproduction in evolution is the persistence of mechanisms in both the plant and animal kingdoms which offer selective agencies the greatest amount of raw material.—E. B. Babcock.

252. ELDERTON, ETHEL M. On the inheritance of the finger-print. *Biometrika* 13: 57-91. 1920.—Historical sketch of GALTON's collection of finger-prints from 2300 persons and treatment of the material. The "natural order" of variation is discussed and the series "arch, small loop, large loop, composite, whorl" is provisionally adopted for the present investigation.—The data are first treated from the "Mendelian standpoint" and the results considered "unsatisfactory." They are then discussed more at length from the "biometric standpoint," and 102 distribution tables, comprising various relationships from parents to cousins, are presented and correlations determined by the method of "mean square contingency." The conclusion is reached that "it is extremely probable that finger-prints are inherited at the same rate as other physical characters, but the type characteristic of any finger in the parent, while most likely to pass to the like finger in the offspring, may easily pass to the homologous finger of the other hand or indeed to any other finger whatever, of the offspring." Inexplicably low values are obtained for the resemblance in finger-prints between cousins. The larger part of the Galton data is restricted to "forefinger" prints and is, therefore, insufficient for more than indications of the direction of research. To the heavier task of collecting "complete sets of family finger-prints . . . the Galton Laboratory is now addressing itself."—Howard J. Banker.

253. ENGLEADOW, F. L. The inheritance of glume length and grain length in a wheat cross. *Jour. Genetics* 10: 109-134. 1 fig. 1920.—Results of a wheat cross between Polish (*Triticum polonicum* L.) and Kubanka (a variety of *T. durum* Desf.). Glume length and kernel length were studied. Glumes and kernels of Polish (P) were long while those of Kubanka (K) were short. F_1 was intermediate; F_2 gave no plants with as long glumes as Polish and none as short as Kubanka, that is, there was a "shift" toward a shorter Polonicum form and a longer Kubanka type. It was possible to distinguish the parental forms and they are found to follow the ratio of 1 long : 2 intermediates : 1 short. Grain length was also studied and behaved in a manner similar to glume length, and author concludes:—"(1) The one factor which governs the P - K glume difference also governs the P - K grain difference. (2) 'Shift' occurs, so that the P and K types as seen in F_2 (glume and grain) are numerically 'shifted' forms of the true F_0 type. The shifted values persist in F_3 . (3) In spite of the demands of the 'double-fertilization' theory, the grain appears, in so far as its length is concerned, to belong to the same generation as the plant on which it is borne, i.e., grain length is a maternal character and segregates on the 1 : 2 : 1 basis in F_2 ." And further that one factor controls: "(1) length of glume, (2) ribs on main lamina of glume, (3) shape of tip of glume, (4) curvature of keel of glume, (5) consistency of material of glume (P is 'papery,' K is more rigid), (6) length of grain, (7) shape and size of cross-section of grain, (8) the angle at which the embryo of the grain is set into the endosperm, (9) number and length of the hairs at the apex of the grain, (10) distinctness of the outline of the apical pad of the grain ('Gipfel-polster'—Keke)." There is some relation between glume length and pubescence of the glume. The heavily pubescent types are also short-glume types.—It was considered that grain length is a maternal character although it is difficult to harmonize this with the double-fertilization hypothesis. Inheritance of hollow and solid straw seems complicated and it is indicated that there may be some relation between the glume-length inheritance and kind of straw.—H. H. Love.

254. FEDERLEY, HARRY. Beiträge zur Kenntnis der Säugetiergametogenese I. Die Spermatogenese von *Mus silvaticus* L. [Contribution to our knowledge of mammalian gametogenesis. I. The spermatogenesis of *Mus silvaticus* L.] *Acta Soc. Sci. Fennicae* 48: 5-37. 1 pl. 1919.

255. FIGINI, GUIDO. Intorno un cas di disgiunzione pigmentale in una infiorescenza di "Antirrhimum majus" L. [A case of pigmental disjunction in an inflorescence of *Antirrhimum majus* L.] *Riv. Biol.* 2: 3-5. 1920.

256. FRIMMEL, F. Notiz über Dominanzverhältnisse bei Fuchsienbastarden. [Note on dominance relations in *Fuchsia* hybrids.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 24: 279-281. 1920.

257. FRUWIRTH, C. Wicke mit linsenförmigen Samen. [Vetches with lens-shaped seeds.] *Zeitschr. Pflanzenzücht.* 7: 356-362. 1 fig. 1920.

258. GALIPPE, V. Nouvelles recherches sur la présence d'organismes vivants dans les cellules des glandes génitales mâles (microbiose, parasitisme normal ou accidentel). [New studies on the presence of living organisms in the cells of the male genital glands (microbiosis, normal or accidental parasitism).] *Compt. Rend. Acad. Sci. Paris* 169: 255-258. 1919.

259. GERBAULT, E. L. Hérités chez la Cymbalaire (première contribution). [Heredity in *Linaria cymbalaria*. First contribution.] *Bull. Soc. Linn. Normandie* VII, 2: 111-116. 1919.

260. GLASER, OTTO. Fertilization and egg-secretions. [Abstract.] *Anat. Rec.* 20: 227-228. 1921.—1. Egg secretions have been known for some time from the eggs of at least 10 species of echinoderms, 2 of annelids, 2 of tunicates, and 1 of molluscs. To this list another mollusc, the oyster, and 2 vertebrates, the fish, *Fundulus heteroclitus*, and the frog, *Rana pipiens*, are added by the author.—2. The importance of these secretions in the initiation of development has been demonstrated by a variety of methods. One of these, that of washing the eggs, has been criticized because in the 18-36 hours required to remove all traces of their exudates the eggs themselves may undergo serious deteriorations of other sorts. By using running sea water, the author has succeeded in shortening this period to 3 or 4 hours, and by removing their jelly and exposing the eggs to charcoal, he has succeeded in sterilizing them completely in 30 minutes.—3. The secretions agglutinate spermatozoa and initiate development. These effects are due, not to 1 substance with 2 side-chains, as postulated in the Fertilizin Theory, but to 2 chemical entities, the lipolysin on the one hand, and the agglutinin, on the other.—4. The lipolysin is a lipolytic ferment and catalyses the hydrolysis of the esters of the lower as well as the higher fatty acids. It may be that more than 1 ferment is involved.—5. The agglutinin very possibly is also a ferment, but the process which it catalyses has not yet been found.—5. A study of the specificities of fertilization must take account of the lipolysin and of the agglutinin. With respect to the former, it is possible to employ lipolysins derived from the eggs of *Arbacia*, *Asterias*, and of the oyster, for the purpose of increasing the fertility of *Echinarachnius* eggs partially sterilized by the removal of their own secretions; with respect to the agglutinin, it is possible to increase very greatly the success of crosses between *Echinarachnius parma* and *Arbacia punctulata*, if one kind or the other of their sex cells, but especially the spermatozoa, is treated with species-true egg secretion prior to insemination. It appears therefore that the agglutination reaction involves specific features because species-true agglutinin has effects quantitatively and perhaps qualitatively different from those of heterogeneous agglutinins.—Whatever transformations views on the initiation of development may undergo within the next few years, the zone within which an understanding must be sought is now marked off by the reaction capacities of perfectly definite physiological compounds.—*Otto Glaser*.

261. GOLDSCHMIDT, R. Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte neubearbeitete Auflage. [Introduction to the science of genetics. 20 lectures for students, physicians, breeders. 3rd revised edition.] 519 p., 178 fig. W. Engelmann: Leipzig, 1920.—See Bot. Absts. 8, Entry 336.

262. GOLDSCHMIDT, R. Der Mendelismus in elementarer Darstellung. [Elementary presentation of Mendelism.] 77 p., 15 fig. P. Parey: Berlin, 1920.—See Bot. Absts. 8, Entry 335.

263. GOLDSCHMIDT, RICHARD. Untersuchungen zur Entwicklungsphysiologie des Flügel-musters der Schmetterlinge. I. Mitteilung. Einige Vorstudien. [Investigations on the physiology of development of the color pattern of the wings in butterflies. I. Some preliminary studies.] *Arch. Entwicklungsmech.* 47: 1-24. 12 fig. 1920.

264. GOWEN, JOHN W. Studies in milk secretion. VIII. On the influence of age on milk yield and butter-fat percentage as determined from the 365-day records of Holstein-Friesian cattle. Maine Agric. Exp. Sta. Bull. 293. 185-196. 1920.—Author gives results of study of relation of age to milk yield and percentage of butter-fat, by which it is shown that yield of milk rises at an ever-decreasing rate until the age of $8\frac{1}{2}$ years, and then declines at an ever-increasing rate as age increases. Curves to fit the means of milk yield and butter-fat percentage are calculated.—*E. Roberts.*

265. GRAVES, R. R. A study of Guernsey breeding. Hoard's Dairyman 59: 1068, 1069, 1072. 1 fig. 1920.—Guernsey sires (166) were divided into 3 classes on basis of sires of production, sires of breeding daughters, and sires of breeding sons. These were traced back to foundation sires and numbers noted. 68.7 per cent of sires were produced by out-crossing, 19.3 per cent by line breeding, and 12 per cent by inbreeding. An attempt is being made to study inheritance of milk and fat. Relation of chromosome theory to facts observed in breeding dairy cattle is pointed out. No case of complete prepotency for production either in Guernsey or Holstein-Friesian breed was found. Variability in production of daughters, and its relation to judging quality of sire is considered.—*E. Roberts.*

266. GROSS, K. Über Vererbung von Augen- und Haarfarbe und den Zusammenhang beider. [On inheritance of eye and hair color and the correlation between them.] Arch. Rass.- u. Gesellschaftsbiol. 13: 164-170. 1920.—On the basis of a pedigree consisting of 4 grandparents, 5 each of the paternal and maternal fraternities, and 5 children the author proposes an hypothesis to account (1) for a brown-eyed child from two blue-eyed parents and (2) the association of blue eyes and brown hair and brown eyes and blonde hair as well as the more usual associations. There are: *P*, a ground-factor for iris pigmentation; *D*, a ground-factor for hair pigmentation; and *F*, an activating factor which affects pigment formation both in iris and hair. The application of this hypothesis to the family in question explains satisfactorily all of the observed combinations and distributions of eye and hair coloration.—[See also Bot. Absts. 8, Entry 228.]—*C. B. Davenport.*

267. GUYER, M. F., AND E. A. SMITH. Experiments with typhoid agglutinins in rabbits. [Abstract.] Anat. Rec. 20: 214. 1921.—Experiments are being conducted to determine whether immunization against germs of disease, practised generation after generation, will eventually result in a truly hereditary immunity. Rabbits may readily be sensitized with typhoid vaccine followed by the living bacteria so that their blood-serum diluted 320 to 640 times will agglutinate living typhoid bacilli. Females so sensitized may transmit to their young and even to their grand-descendants the ability to agglutinate typhoid bacilli in serum diluted from 60 to 160 times.—After 2 or 3 months of development the young of sensitized mothers are likely to show what appears to be a spontaneous rise of titre. If, for example, they have been averaging a titre of 80 for some time, it may rise to 120 or even 160. After a few weeks it drops back again. Rise of titre may be produced by the injection of milk into the blood-stream.—Young from a sensitized mother, when nursed by a normal mother, retain a fairly high titre for several months and may even show the spontaneous rise of titre mentioned. Young of a normal mother, when nursed by a sensitized mother, acquire a fairly high titre, presumably from the milk of the foster-mother, but lose it rapidly after weaning time.—*M. F. Guyer and E. A. Smith.*

268. HAGEM, OSCAR. Einige F_2 und F_6 Generationen bei dem Bastard *Medicago sativa* \times *M. falcata*. [Some F_2 and F_6 generations of the hybrid *Medicago sativa* \times *M. falcata*.] Nyt Mag. Naturvidenskab. 56: 149-165. 1919.—See Bot. Absts. 8, Entry 222.

269. HANSEN, W. Gedanken über Organisation und Arbeitersparnis in der Pflanzenzucht. [Thoughts on organization and labor saving in plant breeding.] Deutsch. Landw. Presse 1918: 261-262. 1918.—Author thinks that brief employment of young people does not further breeding industry, that use of the professor as superintendent deprives leaders in general of his knowledge which could be made available at breeding institutions, that the manag-

ing side should not become too extensive, that follow-up improvements be accompanied by reward of original breeder, that selections can often be reasonably limited and that a general testing of strains by public institutions is needed. [From anonymous review in *Zeitschr. Pflanzenzücht.* 6: 189. Dec., 1918.]-James P. Kelly.

270. HARLAN, HARRY V., AND H. K. HAYES. Occurrence of the fixed intermediate, *Hordeum intermedium* Haxtoni, in crosses between *H. vulgare pallidum* and *H. distichon palmella*. *Jour. Agric. Res.* 19: 575-591. 4 pl. 1920.—A barley, *Hordeum intermedium* Haxtoni, intermediate between typical 6-rowed and typical 2-rowed, has been known for many years and reported in literature as breeding true. Observations made since 1900 throw doubt on validity of fixed intermediates which bear lateral, fertile, unawned florets.—Authors crossed Manchuria and Svanhals varieties. Manchuria is typical 6-rowed and Svanhals has long-awned, central, fertile florets, and awnless, sterile, lateral ones. F_2 plants (87) produced F_2 families which were classified into 7 groups: (1) 22 plants, typical (phenotypical) 6-rowed; (2) 7 plants, lateral florets short-awned, highly fertile; (3) 25 plants, lateral florets awns short to pointed, fertility low; (4) 10 plants, lateral florets awns short to pointed, fertility nil; (5) 7 plants, lateral florets large, awnless, fertility low; (6) 11 plants, lateral florets awnless, fertility nil; (7) 5 plants, lateral florets small, awnless, fertility nil. Assuming a 2-factor hypothesis the following genetic analysis developed with the expected number of plants as indicated: (1) 22 plants homozygous for 6-rowed, $AA BB$, heterozygous for 6-rowed \times regressive 6-rowed, $AA Bb$, and homozygous for regressive 6-rowed, $AAbb$; (2) 11 plants heterozygous for 6-rowed \times *intermedium*, $AaBB$; (3) 22 plants heterozygous for 6-rowed \times 2-rowed, $AaBb$; (4) 11 plants heterozygous for regressive 6-rowed \times 2-rowed, $Aabb$; (5) 5 plants homozygous for *intermedium*, $aaBB$; (6) 11 plants heterozygous for *intermedium* \times 2-rowed, $aaBb$; (7) 5 homozygous for 2-rowed, $aabb$. The 2 groups of 7 sub-groups correspond very well. The first sub-group in above groups is genetically complex. Factor AA is considered epistatic to BB and so all plants of group 1 are phenotypically identical. Evidence of presence of a third factor governing fertility is presented. Stability of *intermedium* form has been fully confirmed.—L. R. Waldron.

271. HERWERDEN, M. A. VAN. [Dutch rev. of: BROMAN, IVAR. Das sogenannte biogenetische Grundgesetz und die moderne Erblchkeitslehre. (The so-called biogenetic law and modern genetics.) Bergmann: München and Wiesbaden, 1920.] *Genetica* 2: 529-530. 1920.

272. HERWERDEN, M. A. VAN. [Dutch rev. of: MORGAN, THOMAS HUNT. The physical basis of heredity. 14×21 cm., 300 p., 117 fig. J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Absts. 5, Entry 422.)] *Genetica* 2: 542-544. 1920.

273. HOGBEN, LANCELOT. The problem of synapsis. *Jour. Roy. Microsc. Soc.* 1920: 269-276. Sept., 1920.—A brief critical review of recent work on the chromosomes. The important point is made that there is not yet agreement concerning the origin of the chromosomes pairing in synapsis nor in the method of pairing. The author thinks that, in view of the uncertainty, emphasized by Miss DIGBY's recent papers, concerning the question whether the chromosomes that pair in the heterotypic prophase are homologous paternal and maternal chromosomes respectively or whether they represent only the daughter halves of a single somatic chromosome which splits in the telophase of the last sporogenous cell (DIGBY), "Such an attempt to provide an interpretation of partial linkage in Mendelian inheritance is exceedingly ambitious" on the basis of the chiasmotype theory of crossing over. The gist of the paper is contained in the conclusion that "While the chromosome hypothesis has proved a great incentive to research—particularly in the problem of sex—its major premise, the reality of synapsis, is in no way firmly established; further knowledge of the relation of chromosomes to the organization of the resting nucleus and a specialized study of individual heterotype chromosomes constitute, therefore, two of the most imperative needs of cytological theory today."—Leonas L. Burlingame.

274. HROMÁDKO, J. Die Variabilität der Nachkommenschaft derselben Futterrübenmutter in der 1. Generation. [The variability of progenies of single mother beets in the first generation.] Zeitschr. Zuckerindust. Böhmen 42: 581-601. 1918.—Author presents data on progeny of a single pedigree mother beet (fodder type) that had been isolated in gauze, and compares them with similar observations of ANDRLIK and URBAN on sugar beet. For fodder-beets coefficients of variability for weight of root, weight of foliage, dry substance of root, and sugar content were respectively 39.7, 35.0, 9.57, and 16.31. In case of sugar-beet the corresponding characteristics gave coefficients of variability, respectively, of 28.46, 32.4, 6.88, and 6.02. Author attributes greater variability of sugar content in former to fact that selection for that is much more recent. [From anonymous review in Zeitschr. Pflanzenzücht. 6: 189-190. Dec., 1918.]—*James P. Kelly.*

275. HUXLEY, JULIAN S. Note on an alternating preponderance of males and females in fish, and its possible significance. Jour. Genetics 10: 265-276. 1920.—In a stock of fish (*Girardinus poeciloides*), according to records of E. G. BOULENGER, the ratio of females to males for nearly a year was 3:1. Later, this ratio among the young produced changed to 2♀:3♂ for a few weeks, after which the numbers of the two sexes became approximately equal and remained so for several years. On the basis of this case and data from other sources, Huxley argues that the most probable explanation is to assume (1) that the male in this fish is the heterozygous sex having formula XY, the female being XX; (2) that a certain proportion of the individuals of genetic composition XY became *somatic* females (= feminized males), owing to the action of some unknown environmental influence; (3) that such "somatic" females produced X and Y eggs, which, by fertilization with X and Y spermatozoa, gave rise in the next generation to a preponderance of males (XY), the YY zygotes being assumed to be non-viable.—*F. B. Sumner.*

276. IRELAND, ALLEYNE. Democracy and heredity—a reply. Jour. Heredity 10: 360-367. 1919.—A brief summary of an article by the writer (Democracy and the accepted facts of heredity. Jour. Heredity 9: 339-342. 1918) is followed by a discussion of criticisms offered by EDWIN G. CONKLIN, MADISON GRANT, PRESCOTT F. HALL, O. F. COOK, and ROBERT CARTER COOK (see May and June, 1919, issues of Jour. Heredity). Author's attitude was that "with few exceptions, the best governed countries were those in which the mass of people had the least control over the administration of public affairs." His "dissent from the conventional view of democracy . . . as a sound, political principle was based upon four main considerations: (a) That the individual and not the mass has been the main source of human advancement; (b) that mental and moral traits in the individual are derived chiefly from heredity and not from environment; (c) that acquired characteristics are not inheritable;" and (d) that assortative mating, encouraged in a democracy, tends to drain the lower classes of talent and genius and increase these qualities in the upper classes. Discussing the criticisms he continues: "the real issue, when stripped of all dialectical trappings, is whether good government depends ultimately upon good human qualities or upon good political machinery. If it depends chiefly upon the former," as author seems to believe, "all discussions of government must be founded in biology." In defense of his postulate of assortative mating he presents data from the works of HAVELOCK ELLIS and FREDERICK ADAMS WOODS which show "that over a period of several centuries there has occurred a striking and progressive decline in the cultural contribution from the 'lower' classes" in the face of increasing democratic opportunity. He closes his discussion by a brief comparison of social conditions under several forms of government which is unfavorable to the democracy, and emphasizes the importance of drawing a distinction between "administration" and "policy."—*Howard J. Banker.*

277. KAPPERT, H. Untersuchungen über den Merkmalskomplex glatte-runzlige Samenoberfläche bei der Erbse. [Studies on the character-complex smooth-wrinkled surface of peas.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 185-210. 5 fig. 1920.

278. KATHARINER, L. Die Entwicklungsgeschichte der digenetischen Trematoden und die Kontinuität des Keimplasmas. [The ontogeny of the digenetic trematodes and the continuity of the germplasm.] Zool. Anzeig. 51: 220-223. 1920.—Reiteration of view that sporocyst, redia, and cercaria are not individuals of distinct generations, but that all have been produced from cleavage cells of same fertilized egg. Life cycle does not therefore involve parthenogenesis nor true paedogenesis.—A. Franklin Shull.

279. KOHN, ALFRED. Der Bauplan der Keimdrüsen. [The structural plan of germ-glands.] Arch. Entwicklungsmech. 47: 95-118. 7 fig. 1920.

280. KOTOWSKI, FELIKS. Zmienneś i Korrelacje w "czystej linii" pszenicy. Tr. vulgare Ostaka biala dublńska. [Correlation and variability in a pure line of wheat.] Polinusch: Tygodnika Rolniczy, Krakau, 1919.—Biometrical studies on 387 wheat plants. Coefficient of variability ranged from 7.06 per cent for length of stem to 43.07 per cent for weight of upper 20 cm. of stem in distributions that were found to be according to QUETELET's law. Correlation between stem length and weight of ear was only 0.20 ± 0.094 and author attributes little breeding value to stem length. Selection made with respect to weight of lower part of stem considered good. Correlation between ear weight and weight of lowest 20 cm. of stem was 0.75 ± 0.043 . Author does not ignore value of direct field selection in respect to non-lodging characteristic. [From anonymous German review in Zeitschr. Pflanzenzücht. 7: 333-334. Nov., 1920.]—James P. Kelly.

281. KRAFKA, JOSEPH, JR. Environmental factors other than temperature affecting facet number in the bar-eyed mutant of *Drosophila*. Jour. Gen. Physiol. 3: 207-210. 1920.—Following the author's previous work with temperature in producing a change in facet number of the ultra-bar mutant of *Drosophila melanogaster* various tests were made to determine the effect of other environmental factors. Certain consistent and apparently significant changes in facet number were obtained but they were of slight amount. Provided a consistent procedure is followed and plenty of moist food available, temperature seems to be the only environmental factor which need be considered in interpreting breeding data in *Drosophila*.—H. H. Plough.

282. KRAFKA, JOSEPH, JR. The post-embryonic development of the compound eye of *Drosophila melanogaster*. [Abstract.] Anat. Rec. 20: 231. 1921.—A histological study has been made of the development of the compound eye of *Drosophila melanogaster* Meig. The embryoblasts are present at the time of hatching, although the ommatidia are not completely metamorphosed until the late pupal period. The segmented condition of the optic ganglion, before definitive visual structures appear, suggests that the formation of the latter may be under the control of the nervous system. A marked reduction in the size of the optic ganglion in the bar-eyed mutant shows that the hereditary factor involves more than the facet number.—Joseph Krafka, Jr.

283. KRÜGER, PAUL. Studien an Cirripeden. [Studies on Cirripedes.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 105-108. 13 fig. 1920.

284. KÜSTER, E. Beiträge zur Kenntnis der panaschierten Laubgehölze. [Variegation in broad-leaved trees.] Mitteil. Deutsch. Dendrolog. Ges. 23: 85-88. 8 fig. 1919.

285. LANCEFIELD, D. E. Two sex-linked lethals of simultaneous appearance in *Drosophila obscura*. Proc. Soc. Exp. Biol. Med. 17: 56-57. 1919.—Genetic data in *Drosophila obscura* indicate the simultaneous appearance of 2 sex-linked lethal factors in the same culture. Breeding tests show that these 2 factors are apparently located at opposite ends of a sex chromosome longer than that of *Drosophila melanogaster*.—H. H. Plough.

286. LAUGHLIN, HARRY H. Illustrating the structure and mathematics of the human germplasm. Jour. Heredity 11: 185-189. 1 fig. 1920.—A figure and description of "an abacus"

consisting of a board with 2' rows of independently revolving spools, suitably labelled, by which the various combinations of genes in two paired chromosomes may be illustrated.—*H. J. Banker.*

287. LA VAULX, R. DE. *L'intersexualité chez un Crustacé Cladocère: Daphne Atkinsoni* Baird. [Intersexuality in a crustacean Cladocera, *Daphne Atkinsoni* Baird. *Compt. Rend. Acad. Sci. Paris* 169: 97-99. July, 1919.

288. LILLIE, FRANK R. *The initial event in fertilization.* [Abstract.] *Anat. Rec.* 20: 225. 1921.—The initial event in fertilization has a primary significance because all others depend for their occurrence upon it and for their degree of efficiency upon its quantitative value. The initial event also displays a high degree of simplicity in relation to subsequent events.—Two new methods of study are applied in this paper to its study: First, the effect of copper salts upon the fertilization reaction; second, a comparison of the relative degrees of specificity between sperm agglutination by egg secretions and the fertilization reaction itself.—Copper has an incomparably greater effect on the initial reaction in fertilization than on later stages of *Arbacia*. It may therefore be used for an analysis of this reaction. The results indicate the presence of a copper-avid substance in the cortex of the egg that is responsible for activation.—The specificity of sperm agglutination by egg secretions between 2 species of *Strongylocentrotus* is found to be of the same order as fertilization specificity.—The copper-avid substance of the cortex of the egg is to be identified with the sperm-agglutinating substance of egg secretion and with the fertilizin of previous papers.—*Frank R. Lillie.*

289. LOTSY, J. P. *Eenige resultaten van het Oenotherajaar 1920.* [Some results of the *Oenothera* year 1920.] *Genetica* 2: 481-528. 57 fig. 1920.

290. LOTSY, J. P. [Dutch rev. of: HONING, J. A. *Erfelijkheidsleer zonder Evolutie theoriën.* Rede uitgesproken bij de aanvaarding van het Hoogleeraarsambt aan de Landbouwhoogeschool te Wageningen 23 Nov. 1920. [Genetics vs. theories of evolution. Lecture given on assuming the office of Professor at the Agricultural School of Wageningen Nov. 23, 1920. H. Veenman: Wageningen, 1920.] *Genetica* 2: 536-537. 1920.

291. LOTSY, J. P. [Dutch rev. of: TÄCKHOLM, G. *On the cytology of the genus Rosa.* A preliminary note. *Svensk Bot. Tidskr.* 14: 300-311. 3 fig. 1920. (See Bot. Absts. 7, Entry 243.)] *Genetica* 2: 547-554. 1920.

292. McCLUNG, C. E. *The chromosomes in fertilization.* [Abstract.] *Anat. Rec.* 20: 228-229. 1921.—1. The process of fertilization consists essentially in the introduction into the egg of a simplex series of chromosomes, duplicating the series left there by oogenesis. Little or no other material is carried by the spermatozoön.—2. Since genetic experiments indicate the equivalence of male and female in heredity, the importance of the chromatin is demonstrated.—3. Behavior of characters in inheritance, indicating factor differences and groupings, are paralleled by conditions of structure and behavior of the chromosomes.—4. The chromosomes introduced by the spermatozoön are reduced to the smallest volume and contain chromatin in the most condensed condition.—5. The chromatin quickly absorbs fluid from the egg cytoplasm and forms a nuclear vesicle in which the chromosomes later appear in the size, form, and number that marked them in the spermatid.—6. Upon union of the egg and sperm pronuclei the paternal chromosomes may remain distinctly grouped and this segregation may be followed through many generations of cells.—7. The individual paternal chromosomes may be traced into the body cells of the embryo and are found later in the germ cells.—8. During the many generations between the ovum and the adult organism in which maturation occurs, the chromosomes have reproduced themselves, each time under different conditions in the organization and constitution of the body, so that in the germ cells they must emerge somewhat different in character from what they were on entering.—9. At the period of maturation in the germ cells, however, the homologous elements from the two

parents unite in the most intimate manner but without the loss of their individual identity, thus completing the process of union inaugurated by fertilization.—10. Still, distinguished by characteristics of form, size and behavior, they are then segregated by chance and distributed again into mature germ cells in a simplex series. Through these they may be traced again into another generation of organisms where they repeat the series of processes.—11. Fertilization, although not necessary to reproduction, and omitted in parthenogenesis, is required in biparental inheritance and there serves the essential purpose of introducing the necessary duplicate control factors—the chromosomes.—*C. E. McClung.*

293. MACCURDY, M. **Conjugation and fission-rate in *Arcella vulgaris* (Ehrenberg).** [Abstract.] *Anat. Rec.* 20: 199. 1921.—In pedigreed cultures of *Arcella vulgaris* under laboratory conditions the fission rate varies considerably. A general average rate in a non-conjugating line derived from 1 parent cell was 1 division for every 2.56 days. At times when estimated for weekly periods, the fission rate for any one line would increase for a period giving a higher rate and this would be followed by a period of slower divisions. The rate in a parallel line might not be the same.—Conjugation was most often found to occur at times of low fission rate. In many cases this was found to occur at intervals of about a month. There are exceptions. Many ex-conjugants gave a higher rate of division for a period following conjugation than parallel lines gave for the same period. Some non-conjugants gave a higher rate than some ex-conjugants. Certain nuclear conditions are pointed out and their probable significance considered.—*M. MacCurdy.*

294. MACOUN, W. T. **Apple breeding in Canada.** *Proc. Amer. Pomol. Soc.* 1917: 11–27. 1 pl., 1 fig. 1918. [See *Bot. Absts.* 7, Entry 985.]

295. MALAQUIN, A. **Reproduction sexuée et reproduction asexuée.** [Sexual and asexual reproduction.] *Compt. Rend. Acad. Sci. Paris* 171: 1403–1406. 1920.

296. MARCHAL, E. **Recherches sur les variations numériques des chromosomes dans la série végétale.** [Studies on the numerical variations of the chromosomes in plants.] *Mem. Acad. Roy. Belgique Cl. Sci.* 4: 1–193. [Year?]

297. MASSART, J. **La notion de l'espèce en biologie.** [The notion of species in biology.] *Bull. Cl. Sci. Acad. Roy. Belgique* 1920: 366–381. 4 fig. 1920.—The classic definition of species according to the author, does not correspond to the Linnean species, nor even to the Jordanian species, but to the line.—A good example of the line is furnished by *Quercus ilex*. The nuts of a tree are similar. They often differ from one tree to another, but often a little group has the same type of nuts. Each tree gives every year the same form of nuts. The young plants show that the nuts of a single tree are similar, but they differ from those of another individual. Each tree has in the young stage more spiny leaves. There are many other examples of stable lines in wild species. In the definition of the line, it is necessary to include neither self-fertilization nor homozygous. In fact, some self-sterile lines (*Lolium perenne*), and some heterozygous lines (*Primula insecta*) are known. The taxonomist and the biogeographer should content themselves provisionally with Linnean and Jordanian species. The lines have three origins: Hybridization, generative mutation, and vegetative mutation.—*Henri Micheels.* (Translated by *Geo. H. Shull.*)

298. MATHEWS, J. WENFORD. **Sheep and wool for farmers. Cross-breeding experiments. Results of lamb-raising trials.** *Agric. Gaz. New South Wales* 31: 761–770, 846–852. 10 fig. 1920.

299. MEVES, FRIEDRICH. **Eine neue Stütze für die Plastosomentheorie der Vererbung.** [A new support for the plastosome theory of heredity.] *Anat. Anzeig.* 50: 551–557. 2 fig. April, 1918.—Author offers evidence, based upon studies of fertilization of egg of nematode *Oxyuris*, that plastosomes or “plastrochondria” are introduced into egg by spermatozoon; and that they, together with similar bodies from egg, are portioned out to first two daughter cells of zygote, and presumably play a part in heredity as well as the nuclei.—*F. B. Sumner.*

300. MOON, VIRGIL H. Heredity as a factor in the etiology of neoplasms. *Medical Rec.* 97: 14-16. 1920.—Author records an autopsy on a man who died of carcinoma of the bladder. This man's brother, father, grandfather, and one uncle had likewise died of carcinoma.—He also cites a case of a man who died of pneumonia. The father, brother, and one uncle had each died of cancer. The deceased man had no evidence of cancer, but revealed on autopsy a well developed carcinoma of the stomach.—A short review is given of the observations and statistics of WILLIAMS, BUTLIN, MUNN, WARTHIN, EWING and MAUD SLYE on the heredity of cancer and other tumors in man and other animals. The conclusion is reached that a tumor-producing potentiality is an hereditary trait and that the conditions which are assigned by pathologists as possible causes of cancer probably act merely as exciting or determining factors in individuals who have received a tendency to the neoplastic type of growth as a heritage from their ancestors.—*Geo. N. Papanicolaou.*

301. MOORE, CARL R. Sex-gland transplantation and the modifying effect in rats and guinea-pigs. [Abstract.] *Anat. Rec.* 20: 194. 1921.—In the white rat, testicular tissue grafted into young, spayed females, will persist for a period of nine months. Associated with the testicle graft the behavior of the animal is decidedly male-like.—Ovaries transplanted into young, castrated males will persist and grow for several months. Such an animal, as an adult, exhibits a maternal behavior towards the young. Somatic differences between male and female are too slight to be of value in a differential diagnosis of maleness or femaleness.—In guinea-pigs, ovaries grafted into young, castrated males persist for several months and are accompanied by certain somatic modifications in the male; the teats of the mammary glands hypertrophy and compare favorably in size with those of pregnant females, though little or no secretion could be expressed. Psychical modifications of the male are not, in the author's experience, subject to modification.—Testicular tissue grafted into young, spayed females can be recovered nine months later. No mature sperm were present in the seminiferous tubules but active mitoses were common in cells of the germinal epithelium, a considerable amount of which may remain. Females bearing such testicle grafts exhibit the characteristic male sex behavior (psychical modification) and the external genitalia appear male-like (somatic modification).—In the white rat ovarian grafts will persist for eight months in a male with 1 normal testicle. Graafian follicles continue their development normally up to the maturation period of the ovum. Subsequently the follicles undergo atresia without ovulation.—There appears to be no deleterious influence of secretions from either sex gland upon the opposite one.—*Carl R. Moore.*

302. MORGAN, T. H. The effects of castration of hen-feathered Campines. *Biol. Bull.* 39: 231-247. 10 fig. 1920.—Completely castrated hen-feathered male Campines develop normal male plumage.—*H. D. Goodale.*

303. MORGAN, T. H. The effects of ligating the testes of hen-feathered cocks. *Biol. Bull.* 39: 248-256. 11 fig. 1920.—Ligation of the testes, if sufficient to cause complete degeneration of the testes, results in assumption of male plumage by hen-feathered adult cocks.—*H. D. Goodale.*

304. MORGAN, T. H. The genetic factor for hen-feathering in the Seabright Bantam. *Biol. Bull.* 39: 257-259. 1920.—Additional data are given, but without settling definitely whether one or two factors are involved, and proof is presented that the character is not sex-linked.—*H. D. Goodale.*

305. MULLER, H. J. Further changes in the white-eyed series of *Drosophila* and their bearing on the manner of occurrence of mutation. *Jour. Exp. Zool.* 31: 443-473. 3 fig. 1920.—Three new mutations of the *W* gene in the X chromosome of *Drosophila* are described, the characters produced being eceru, a straw color, ivory (found by A. H. STURTEVANT) and a new white. In addition an orange-eyed male appeared which did not transmit its mutant eye color. A consideration of the manner in which these characters appeared suggests that the mutations which produced them occurred at various times,—the first in a late oögonial cell or

oöcyte, the second in an early stem cell of the ovary, and the third in the early cleavage of the individual in which it appeared. It is possible that the orange eye arose by a mutation of the *W* gene in a somatic cell of the early embryo. The commonly accepted view that mutations are more likely to occur in gametes or germ cells near the period of maturation receives no support from the data on this series. It is shown, however, that there is a much greater chance that any mutation will show itself in a single individual than in several. Further study of the allelomorphs of the white-eye series suggests other important conclusions with respect to the origin of mutations. Since mosaic mutants involving recessive sex-linked genes are always males, it would appear that mutations occur in only one member of a pair of chromosomes at any one time. If the event which produces a mutation is so localized as to affect a single locus in only one of a pair of homologous chromosomes it seems unlikely that the artificial influencing of the kind of mutation is a possibility. It is further noted that the variations of the *W* gene are not random deviations for they are all in a definite direction, and the extreme variants seem to be the more common. For this reason selection if concerned with this locus alone would not be cumulative.—*H. H. Plough.*

306. MULLER, H. J., AND E. ALTENBURG. A study of the character and mode of origin of eighteen mutations in the X-chromosome of *Drosophila*. [Abstract.] *Anat. Rec.* 20: 213. 1921.—Since the 18 mutants found in the experiment of the writers on mutation frequency were non-selected or random samples of (detectable) mutants in the sex-chromosome, a study of them furnishes quantitative data bearing on the nature of mutations. (1) All were lethals or sub-lethals. Of the 5 sub-lethals, 4 produced morphological abnormalities. (2) All were completely recessive except 1 mutant of the yellow-mouse type. (3) Half of the loci involved are crowded into the 1.5 units space to the left of white eye (the rest being scattered rather evenly). This indicates that this region of the chromosome is really much longer than the map represents. (4) All the lethals gave negative tests for "deficiency," hence deficiencies are evidently much rarer than ordinary lethal mutations. (5) Three lethals were allelomorphs of known non-lethal factors, and 2 of these lethals were allelomorphs of each other. Of the latter 1 became dominant in its lethal effect when crossed to a non-lethal allelomorph. (6) Lethals very near 'duplicated' loci remained unaffected by the 'duplication.' (7) Mutation occurs with not markedly different frequency in the 2 sexes, for 7 of the lethals were found in the maternal, 11 in the paternal chromosome. (8) These mutations occur not only near maturation, but also in earlier germ cells, in either sex, as shown by the original appearance of some of the lethals in 2 sisters simultaneously. (9) Two of the original mutant individuals contained 2 different lethals at once; in 1 case these were in opposite chromosomes, in the other case in the same chromosome.—*H. J. Muller and E. Altenburg.*

307. NEWMAN, H. H. The experimental production of twins in the starfish *Patiria miniata*: with a discussion of the causes of twinning in general. [Abstract.] *Anat. Rec.* 20: 190-191. Jan. 20, 1921.—A series of separate twins and of double monsters were produced under 3 different experimental conditions: (a) As the result of an extremely belated parthenogenetic development; (b) as the result of fertilizing *Patiria* eggs with the sperm of another species of starfish; (c) as the result of overcrowding normally fertilized eggs. All 3 methods involve retardation of development, with loss of precise axiate organization at some critical period. Redifferentiation or resumption of axiate organization occurs, but unity of organization has been lost, so that 2 or more axes or gradients appear instead of the original 1. Thus twins or double structures arise.—A series of twin types are produced which represent the results of differences in the earliness of onset of retardation and more or less complete recovery. The series includes completely separated half-sized and quarter-sized blastulae and gastrulae, full-sized gastrulae, full-sized gastrulae with 2 or more archentera, larvae in which the archenteron branches anteriorly into "dicephalous" larvae, and advanced bipennariae with paired, instead of only left-hand, madreporic pores and pore-canals. This physiological theory of twinning agrees with the writer's formerly expressed theory to explain the cause of specific polyembryony in the armadillo.—*H. H. Newman.*

308. OKKELBERG, PETER. The early history of the germ cells in the brook lamprey, *Entosphenus wilderi* (Gabe), up to and including the period of sex differentiation. [Abstract.] Anat. Rec. 20: 201. 1921.—The germ cells are segregated before the germ layers are definitely established. They are first recognized about the time when the mesoderm separates from the entoderm (embryo about 191 hours old). The definite germ cells, in both sexes, take their origin from these primordial germ cells, and from no other source. Numerous germ cells degenerate in every individual and they never take part in the formation of somatic structures. During the period of sex differentiation 2 types of cells are found in practically every individual, those which continue to divide and those which stop dividing and enter upon a synaptic and growth phase. The former are taken to be potential male cells (spermatogonia) or indifferent cells and the latter potential female cells (primary oöcytes). The relative proportion of the 2 kinds of cells apparently determines whether the larva shall become a male or a female. Observations seem to warrant the conclusion that each larva carries in it the potentiality of both sexes and that sex, therefore, is not irrevocably fixed at or before fertilization. When a larva becomes definitely established as a male there rudimentary eggs are frequently found in the adult testis. In the adult condition the number of individuals of each sex is about the same.—*Peter Okkelberg.*

309. ORENSTEEN, MYER M. Correlation of cephalic measurements in Egyptian born natives. Biometrika 13: 17-24. 1920.—Means, standard deviations, and coefficients of correlation of length and breadth of head are given for different provinces. Correlation ranges from $+0.208 \pm 0.033$ to $+0.369 \pm 0.028$.—*John Rice Miner.*

310. OSLER, H. S. Origin and development of pedigreed varieties of grains. Michigan Acad. Sci. Ann. Rept. 21: 139-143. 1919.—Important varieties of small grains came into use largely in three ways, introduction, selection, and hybridization. The origin of a number of improved varieties is given. The method of production and the distribution of Red Rock wheat and Rosen rye is briefly summarized.—*H. K. Hayes.*

311. PELSENEER, PAUL. L'hybridation chez les Mollusques. [Hybridization in molluscs.] Compt. Rend. Acad. Sci. Paris 168: 1056-1059. 1919.

312. PÉZARD, A. Loi du "tout ou rien" ou de constance fonctionnelle, relative à l'action du testicule considéré comme glande endocrine. [Law of "all or nothing" or of functional constancy relative to the action of the testis considered as an endocrine gland.] Compt. Rend. Acad. Sci. Paris 172: 89-92. 1921.

313. PÉZARD, A. Secondary sexual characteristics and endocrinology. Endocrinology 4: 527-540. 2 fig. 1920.—A number of secondary sexual characters are dependent upon internal secretion of testis. Effect of secretion begins at puberty and continues, in poultry, through sexual life with remarkable constancy. Effect is lost with removal of testis, but not more than $\frac{1}{5}$ of total weight of testis is required to produce effect. Any fraction of testis large enough to produce any morphogenetic effect produces the entire effect (tested on combs). Some characters recognized as racial are dependent on this secretion. Meat diet produces modification in structure and sexual behavior, not directly, but by first inducing changes in testis.—*A. Franklin Shull.*

314. PLAHN-APPIANI. Die Individualität von Zucker- und Futterrübe. [Individuality of sugar beets and fodder beets.] Centralbl. Zuckerindust. 27: 220-221. 1919.—Author refers to doubt sometimes expressed about distinguishing certain white fodder beets from sugar beets. He would not ascertain sugar content as this is transgressive in its variation but would use a criterion dependent on structural characteristics as specific weight or data on volume secured in calculation of specific weight. The volume figures for sugar beet lie between 92 and 95 and for fodder beets from 97 to over 100.—*James P. Kelly.*

315. P[OPENOE], P. A contribution to eugenics. [Rev. of: DUNLAP, KNIGHT. Personal beauty and racial betterment. C. V. Mosby Co.: St. Louis, 1920.] Jour. Heredity 11: 258. 1920.
316. P[OPENOE], P. Eugenics made easy. [Rev. of: HUMPHREY, SETH K. The racial prospect. 261 p. Charles Scribner's Sons: New York, 1920.] Jour. Heredity 11: 237. 1920.
317. P[OPENOE], P. A French student of the birth-rate. [Rev. of: RAGEOT, GASTON. La Natalité. (Nativity.) 296 p. Ernest Flammarion: Paris, 1918.] Jour. Heredity 11: 237. 1920.
318. P[OPENOE], P. A text book of biology. [Rev. of: SHULL, A. FRANKLIN, GEORGE LA RUE, AND ALEXANDER G. RUTHVEN. Principles of animal biology. 16 × 24 cm., ix + 441 p., 245 fig. McGraw-Hill Book Co.: New York, 1920.] Jour. Heredity 11: 214. 1920.
319. PUNNETT, R. C., AND P. G. BAILEY. Genetic studies in poultry. II. Inheritance of egg-colour and broodiness. Jour. Genetics 10: 277-292. 1 pl., 11 fig. 1920.—Reciprocal crosses between Brown Leghorns which are not broody and lay white eggs and Black Langshans which are broody and lay brown eggs, also crosses between the Langshans and Gold-Pencilled Hamburgs, were made with the following results.—Egg color:—Leghorn ♀ × Langshan ♂: F₁, intermediate; F₂, nearly half white, the rest tinted, but mostly lighter tints. Reciprocal cross: F₁, as before; F₂, all shades represented, but curve slightly bimodal. Langshan ♀ × Hamburg ♂: F₁, as before; F₂, all grades represented and curve distinctly bimodal. The results in this case are explained on the basis of a major factor for egg pigment and several minor factors all of which are thought to be present in the Langshans and absent in the others.—Broodiness: Leghorn ♀ × Langshan ♂: F₁, broody; F₂, 19 broody, 47 non-broody. Langshan ♀ × Leghorn ♂: F₁, broody; F₂, 8 non-broody. Langshan × Hamburg: F₁, slightly broody; F₂, 4 broody, 34 non-broody.—H. G. May.
320. RICHEL, CHARLES. La sélection humaine. [Human selection.] 8°, 262 p. F. Alcan: Paris. 1919.
321. RICHEL, CHARLES, ET HENRY CARDOT. La transmission héréditaire des caractères acquis et l'accoutumance des microbes. [The hereditary transmission of acquired characters and the tolerance of the microbes.] Compt. Rend. Acad. Sci. Paris 171: 1353-1358. 1920.
322. RIDDLE, OSCAR, AND ELLINOR H. BEHRE. On the relation of stale sperm to sterility and sex in ring-doves. [Abstract.] Anat. Rec. 20: 211. 1921.—The very abnormal sex ratios obtained from hybrid birds by several investigators require the study of all factors possibly concerned. Practical work in pigeon hybridization also sometimes requires a knowledge of the length of time the sperm may remain alive in the female oviduct. On the latter point, it is found that the spermatozoa of the ring-doves (mostly fully fertile hybrids of closely related species) used retained their fertilizing power during very nearly 8 days, reckoned from the time of isolation of the male to the hour the egg is laid.—“Staleness” of the spermatozoa did not appreciably affect the sex ratio in 213 individual tests made with a dozen pairs of birds. The degree of staleness was known in each test. Some of the sex ratios obtained during the experiment cannot be considered normal but these abnormal ratios have been shown to be associated with other factors investigated earlier. The abnormal sex ratios that have been obtained in previously reported investigations on these doves, and any results that may be later obtained from them or from similar birds, are here shown to be not complicated by effects due to staleness of the spermatozoa.—Oscar Riddle and Ellinor H. Behre.
323. RIOLLE, Y. TROUARD. Les hybrides de *Raphanus*. [Raphanus hybrids.] Rev. Gén. Bot. 32: 438-447. Fig. 1-3. 1920.—The author previously studied hybrids of *R. Raphanistrum* with varieties of *R. sativus* and found superficial homogeneity in F₁ and visible dissociation in F₂. She now attempts to demonstrate that while F₁ is homogeneous

as a whole, individual plants themselves are extremely variable. Reciprocal hybrids of *Raphanistrum* and *sativus* were highly vigorous and gave comparable results under a variety of conditions. F_1 flowers as a rule were white, but there were exceptions, especially in later blossomings. One plant had one twig white-flowering and one yellow-flowering. In later blossomings some flowers were observed with two petals white and two yellow and some flowers showed tinges of rose or violet at end of blooming period. Structure of silique seemed to be intimately connected with color of flower and varied within wide limits on hybrid plants, the limits on parents being much narrower. Sugar content was high and starch low in the hybrids as in radishes, a condition contrary to that in *R. Raphanistrum*. In character of anthocyanin radishes may be divided into 3 groups: Rose or red; violet; black, gray or white. Red \times black or gray gives violet. Red \times yellow gives violet, but with dissociation, which indicates that yellows are themselves hybrids. Red \times violet gives violet, but the author considers dominance of violet here simply a matter of concentration of violet pigment, for a mixture of solutions of red and violet anthocyanin gives violet solution. In F_2 every possible combination of parental characters occurs as regards color of flower, structure of silique, and root development; but there are all sorts of intermediates, and types which appear to return to those of parent are not identical with them. It is argued that this demonstrates that MENDEL's law is only a directive one. From her studies of F_1 populations the author concludes that law of uniformity of F_1 is not absolute. She favors NAUDIN's idea that the hybrid is a living mosaic of more or less discordant elements which may at times visibly dissociate in F_1 individuals. She argues that everything connected with life is mobile and changing and that it is practically impossible to generalize from particular bases. MENDEL's law does not, therefore, approach the validity of a mathematical law.—*R. E. Clausen.*

324. ROBB, WILLIAM. Plant breeding experiments at the University of St. Andrews (Conducted by the late John H. Wilson). Scottish Jour. Agric. 3: 391-402. 2 pl., 2 fig. 1920.—Dr. WILSON was responsible for the establishing of extensive plant-breeding experiments in Scotland. The accomplishments of the last four years preceding his death have not been previously published. During these years he grew many thousands of hybrid potato seedlings and had reduced his stocks to 240 selected varieties. In a cross of Sandy and Golden Rain oats the F_1 and F_2 plants all had more or less one-sided panicles while both parents have open spreading panicles. In the F_2 progeny of a cross between Daubeney and Huskless oats were types with two awns to the spikelet and an articulation suggestive of the wild oat, *Avena fatua*.—*H. V. Harlan.*

325. ROBERTS, E. A note on inheritance of polydactylism in cattle. [Abstract.] Anat. Rec. 20: 211. 1921.—A normal bull mated to a polydactylous cow produced a polydactylous female. This daughter produced, from matings to a normal bull, 3 calves all of which showed the polydactylous condition.—*E. Roberts.*

326. ROBERTS, HERBERT F. Yellow-berry in hard winter wheat. Jour. Agric. Res. 18: 155-169. 2 fig. 1919.—See Bot. Absts. 6, Entry 32.

327. ROBERTSON, W. R. B. Further studies on inheritance of color in the turkey. [Abstract.] Anat. Rec. 20: 213-214. 1921.—The pattern of the black variety is allelomorphic to the pattern of the bronze. Black is almost, not entirely, dominant, there being usually about 6 bronze feathers widely distributed. F_1 black (bronze) σ^7 back-crossed to his bronze dam gave 50 per cent of F_2 bronze and 50 per cent black. An F_1 black (bronze) φ by a bronze σ^7 gave the same result. The bronze of F_2 , mated inter se, gave only bronze, the F_1 blacks gave black and bronze.—Black is likewise allelomorphic to the bourbon red and the Narragansett patterns. A bourbon red φ by the F_1 black (bronze) σ^7 gave 50 per cent bronze-red intermediates, like F_1 of the bronze by red cross, and 50 per cent a rusty black. An F_1 black (bronze) φ by a bourbon red σ^7 gave 50 per cent bronze-red intermediate and 50 per cent rusty black. The latter shows a slight trace of barring with white in the primaries. A Narragansett φ by an F_1 black (bronze) σ^7 gave 50 per cent black and 50 per

cent bronze.—The last cross shows also that the Narragansett pattern is probably allelomorphie to bronze. Narragansett is also likely allelomorphie to bourbon red. Reciprocal crosses gave F_1 much like the Narragansett but with subterminal black bands less intense and slaty regions slightly auburn.—These 4 patterns evidently form a system of quadruple allelomorphs.—White is recessive to color. A white ♀ by a bourbon red ♂ gave F_1 all bronzed intermediate; she evidently carried bronze but lacked the factor for color. Bronze ♀ by white ♂ gave bronze. F_2 was 75 per cent bronze and 25 per cent white.—W. R. B. Robertson.

328. ROBERTSON, W. R. B. Unusual tetrads and their bearing on the problem of crossing-over. [Abstract.] Anat. Rec. 20: 199. 1921.—Among the ring-like tetrads resulting from the pairing of compound chromosomes, such as occur in *Chorthippus curtipennis*, there have been found again cases of a condition in which the 2 strands of 1 of the members of a pair show 1 complete revolution about each other which is not present in the strands of the other member of the pair. This torsion occurs, of course, in a region of the tetrad where disjunction has taken place—that is, at an internode between 2 points of the tetrad which are still in conjunction.—This may mean: (1) That the pairing chromosomes were each split and the halves independently twisted about each other before parasynapsis took place; or (2) that crossing-over between 1 strand of each of the conjugants has taken place at some previous time.—If the latter be the correct interpretation, then opposite sides of the ring would each receive 1 strand of the paternal and one of the maternal pair, and the 1st division be accordingly equational for the bulk of the tetrad.—The important point, however, is that the crossing-over hypothesis gives a very satisfactory explanation of the abnormality.—W. R. B. Robertson.

329. RYX, GEORG VON. Methoden einer exakten Prüfung des Fortschrittes bei der Zuckerrübenzücht. Paritäts- und doppelte Standard-methode. [Methods of exact testing the advancement in sugar-beet breeding. Parity and double standard method.] Zeitschr. Pflanzenzücht. 7: 227–237. 1920.—Author discusses need for constant standard by which to judge results of progress in sugar beet breeding, explaining that one lot of seed cannot be kept for that purpose because of its deterioration in storage. He explains two standards and how to secure them: (1) Parity method, or method of direct comparison with standard beet specimens, in which a line is bred pure and maintained pure for purposes of comparison. (2) Double standard method, or method of comparison with a corrected and doubly checked standard, in which half the seed from each season is planted in turn the next two seasons.—H. B. Tukey.

330. SAKAMURA, T. Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen. [Experimental studies on cell and nuclear division with special reference to form, size, and number of chromosomes.] Jour. Coll. Sci. Imp. Univ. Tokyo 39: 1–221. 7 pl., 24 fig. 1920.—The paper is chiefly of interest to cytologists but the following conclusions are important for geneticists. Chromosomes were found normally to be constant in number and to retain their identity. Constrictions produced by attachment of spindle fibers were found to be of wide occurrence in plants and animals and to serve as excellent marks of identification of particular chromosomes. Fragmentation sometimes occurs at constrictions and increases the chromosome number. Such fragmentations become heritably fixed and give rise to varieties with deviating chromosome numbers. Such abnormalities, as well as those due to failure of particular pairs to segregate, are brought about by conditions in surrounding cytoplasm and are the effects of outer or inner factors which may also produce mutation by direct action on the germ-plasm. Nearly related species and varieties of some genera, e.g., *Triticum*, differ by multiples of the x or reduced number characteristic of the ancestral species. Fragmentation, failure to segregate (non-disjunction), inclusion of two or more nuclei in one cell or one membrane may be produced by physical or chemical means or by influence of parasites. Author did not secure normal development of pollen grains with such unusual chromosome equipment.—Leonas L. Burlingame.

331. SCHIEMANN, E. Zur Frage der Brüchigkeit der Gerste—eine Berichtigung. [On the question of brittleness in barley—a correction.] Zeitschr. Indukt. Abstamm.- u. Vererb. 21: 53. 1919.—A correction of a misstatement in an earlier paper, due to a typographical error, and a reply to a criticism of the author's interpretation of the inheritance of brittleness of rachis in barley crosses.—C. B. Hutchinson.

332. SCHMIDT, JOHS. IV. The genetic behaviour of a secondary sexual character. Compt. Rend. Trav. Lab. Carlsberg 14: 1-12. 6 pl. 1920.

333. SCHRADER, FRANZ. Peculiar chromosomal phenomena in a Homopteran. [Abstract.] Anat. Rec. 20: 200-201. 1921.—In *Pseudococcus nipae*, a Homopteran, both sexes have a diploid number of 10 chromosomes. In the female, 5 tetrads are formed and reduction results in the haploid number of 5 chromosomes as in the ordinary manner. In the male, the growth stages of the spermatocytes show 5 of the 10 chromosomes condensing in advance of the remaining chromosomes. These 5 chromosomes can be identified in following stages by the tendency to remain in a more or less clumped group. No trace of tetrad formation could be found. The 1st spermatocyte division is equatorial and 10 chromosomes go to each pole. The 2nd division is reductional and this apparently takes place in that the 5 clumped chromosomes go to one, and the remaining 5 to the opposite pole. Early spermatids still show 5 chromosomes and the formation of spermatozoa seems to follow ordinary lines.—Franz Schrader.

334. SCHULTZ, WALTHER. Kälteschwärzung eines Säugetieres und ihre allgemeinbiologischen Hinweise. [Darkening of a mammal by cold and its general biological significance.] Arch. Entwicklunsgmech. 47: 43-75. 12 fig. 1920.

335. SIRKS, M. J. [Dutch rev. of: GOLDSCHMIDT, R. Der Mendelismus in elementarer Darstellung. [Elementary presentation of Mendelism.] 77 p., 15 fig. P. Parey: Berlin, 1920.] Genetica 2: 532-533. 1920.

336. SIRKS, M. J. [Dutch rev. of: GOLDSCHMIDT, R. Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte neubearbeitete Auflage. [Introduction to the science of genetics. 20 lectures for students, physicians, breeders.] 3rd revised ed., 519 p., 178 fig. W. Engelmann: Leipzig, 1920.] Genetica 2: 533-534. 1920.

337. SIRKS, M. J. [Dutch rev. of: HERIBERT-NILSSON, NILS. Ein Übergang aus dem isogamen in den heterogamen Zustand in einer Sippe der *Oenothera Lamarckiana*. (A transition of the isogamic to the heterogamic condition in a strain of *Oenothera Lamarckiana*.) Hereditas 1: 213-220. 1920.] Genetica 2: 545-546. 1920.

338. SIRKS, M. J. [Dutch rev. of: MALINOWSKI, EDMUND. Die Sterilität der Bastarde im Lichte des Mendelismus. (The sterility of hybrids in the light of Mendelism.) Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 225-235. 1920.] Genetica 2: 540-542. 1920.

339. SKUPIENSKI, F.-X. Sur la sexualité chez une espèce de Myxomycète Acrasiée Dictyostelium mucoroides. [On sexuality in a species of Acrasidae Dictyostelium mucoroides.] Compt. Rend. Acad. Sci. Paris 167: 960-962. 1918.

340. STEINACH, E. Verjüngung durch experimentelle Neubelebung der älternden Pubertätsdrüse. [Rejuvenation through experimental revitalization of the senile sex glands.] Arch. Entwicklunsgmech. 46: 557-619. 9 pl., 7 fig. 1920.—By the use of two methods, viz., section of the vas deferens and transplantation of gonads, Steinach has brought about rejuvenescence in senile rats. Great care was used to make sure that the rats were really senile before each experiment was begun. Histological examinations of the testes were made. After section of the vasa deferentia, a multiplication of Leydig's cells took place, accompanied by a return to the normal vigorous condition of rats in the prime of life. The span of life of these rats exceeded the normal by about 25 per cent. A rejuvenescence also was observed in 3 old men on whom similar operations were performed. Transplantation of testes and ovaries gave like results.—H. D. Goodale.

341. STURTEVANT, A. H. **The vermillion gene and gynandromorphism.** Proc. Soc. Exp. Biol. Med. 17: 70-71. 1920.—MORGAN and BRIDGES (Carnegie Inst. Washington Publ. 278. 1919) conclude from a study of gynandromorphs that the somatic appearance of any part of the body is due to its own chromosomal constitution. A gynandromorph obtained by the writer indicates that this is not true for all factors. The father of the gynandromorph carried several sex-linked characters including vermillion, none of which were present in the mother. The whole head of the gynandromorph was male in constitution, since it showed all the sex-linked characters of the father except vermillion. It is apparent therefore that the vermillion eye color is not determined by the genetic constitution of the eye pigment cells but by that of some other part of the body.—H. H. Plough.

342. TENNENT, DAVID H. **Chromatic material in hybridization.** [Abstract.] Anat. Rec. 20: 229. 1921.—Closeness of relationship is by no means indicative of the readiness with which the initial impulse to development may be received, nor a sure criterion of the extent to which it may proceed. Some species hybridize in nature; some eggs show a cortical block which may be removed readily by various methods. The entrance of a spermatozoön following the removal of the cortical block may result in development, or it may result in an instantaneous, or in a slower but none the less complete cytolysis of the egg.—In some crosses, in which a specialized type of development is superimposed on a more general type, development proceeds regularly up to the point of deviation of special from general. Internal block may become effective apparently at any stage after the entrance of the spermatozoön. Many degrees of inhibition, ranging from failure of the germ nuclei to unite to failure of synapsis, have been described, but no methods of overcoming its effects have been devised.—From our knowledge of straight-fertilization and of cross-fertilization we have come to look upon development as an attribute of the egg. In eggs of *Arbacia* fertilized by sperms of *Möira*, an interordinal cross, a rhythmic appearance of basophilic bodies in the cytoplasm may be seen. A similar phenomenon has been described in many species-fertilized eggs. By the application of binuclearity hypotheses, founded in part on the chromidial hypothesis, to the metazoan cell, these basophilic bodies have been explained as somatochromatin or trophochromatin. The evidence for the emission of chromatin as such from the nucleus is not convincing. In the conditions of the experiment mentioned, a foreign enzyme was introduced. Its presence produced a coalescence of granules into coarsely dispersed aggregates. It is suggested that this coalescence is a result of dehydration due to the activity of the foreign enzyme in the cytoplasm. These bodies are regarded as synthesized in the cytoplasm. We cannot hope to distinguish between more than very widely spaced steps in synthesis within the cell by methods of staining. The egg and spermatozoan may form a harmonious system, the degree of harmony being a function of cytoplasmic substrate and nuclear enzyme.—David H. Tennent.

343. UBISCH, G. VON. II. **Beitrag zu einer Faktorenanalyse von Gerste.** [Contribution to a factorial analysis of barley.] Zeitschr. Indukt. Abstamm.- u. Vererb. 20: 65-117. 7 fig., 11 diagrams. 1919.—The results of barley hybridization experiments to determine gametic formulae for nine characters, are given. On the factor basis the conclusions are as follows: (1) Brittleness of rachis; two factors both of which must be present in either homozygous or heterozygous condition in order to produce brittleness. The character is, however, affected by moisture conditions at maturity and by the physiologically correlated laxity of spike. (2) Length of rachis internodes; one or more lengthening factors may be present. In *Hordeum spontaneum* three are present in homozygous condition. (3) Sterility of side florets; two factors involved but no data are given. (4) Awn length—there is one lengthening factor *A*. *A* alone or modified by presence of either of two other factors gives awn length of common barleys. All three present in homozygous condition produce wild awn type. If *A* is absent, shorter awns result due to the modifying effect of the other factors. (5) Hoods,—either one or two factors act in conjunction with *A*, the factor for long awns. Alternative interpretations are offered of the peculiar case of long awns appearing in F_2 generation in crosses between hooded and short-awned forms. Data are cited showing linkage between factors for long awn and laxness of spike; similarly for short awn and density of spike. (6) Culm length,

—height of culm is governed by presence of one or more of three possible factors. Data are given showing linkage between tall culms, long awns, and lax spike. (7) Hulllessness of kernel, (8) color of glumes, and (9) type of basal bristle are each due to a single genetic factor difference.—*F. P. Bussell*.

344. VEIT, OTTO. Studien zur Theorie der vergleichenden Anatomie. (Die Rolle der Ontogenie in der Phylogenie.) [Studies on the theory of comparative anatomy. The rôle of ontogeny in phylogeny.] Arch. Entwicklungsmech. 47: 76-94. 1920.

345. WALTHER, AD. R. Sammelreferat, betreffend einige neuere Arbeiten über die Vererbung quantitativer Eigenschaften. [Composite review of a few recent works on the inheritance of quantitative characters.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 282-289. 1920.

346. WHITING, P. W. The production of mosaic males from fertilized eggs in Hymenoptera. [Abstract.] Anat. Rec. 20: 210. 1921.—An orange-eyed mutation in the wasp, *Hadrobracon*, acts as a complete recessive to the normal black. Inheritance is "sex-linkoid," the males being haploid and usually parthenogenetically produced. Heterozygous females, isolated as virgin, produce black and orange males in equal numbers. When orange males are mated to black females all offspring are black. In reciprocal mating, daughters are black and most of the sons are orange. A few of the sons, however, are black, showing that they come from eggs into which the black-bearing spermatozoön has penetrated. Such anomalous blacks have in some cases bred like black, showing that gonads, as well as eyes, are paternal in origin. Others have bred like orange, showing that, while eyes are paternal, gonads are maternal. Orange-eyed brothers of anomalous blacks have bred like normal orange, except that in 1 case such a male bred like a black. Any one male when bred to orange female produces either black or orange daughters, never both, showing that gonad is haploid and either paternal or maternal in origin.—*P. W. Whiting*.

347. W[OODS], F. A. The meaning of continuous variation in color. Jour. Heredity 11: 84-86. 1 fig. Feb., 1920.—A plate of 20 specimens of the beetle *Rhynchophorus cruentus* showing a "perfectly continuous graduation in a color pattern," with brief textual comment.—*H. J. Banker*.

348. WOODS, FREDERICK ADAMS. A definition of heredity—"Nature vs. Nurture" not a good expression. Jour. Heredity 10: 426-427. Dec., 1919.—The lack of "scientific definiteness" is pointed out in the terms "nature" and "nurture" because of the many senses in which the words are used, and the use of the expression "heredity" is criticized for the same reason.—*Howard J. Banker*.

349. WOODS, FREDERICK ADAMS. Portraits of early Americans. Jour. Heredity 10: 212-222. Fig. 13-18. May, 1919.—A "Review and supplementary research based upon 'The Founders: Portraits of Persons Born Abroad Who Came to the Colonies in North America before the Year 1701' by Charles Knowles Bolton." The writer believes he finds evidence from this collection and other portraits that there has been a progressive change in the physiognomy of the Nordic race from the mongoloid to the deep-set eye and in other characters.—*Howard J. Banker*.

350. YAMAGUCHI, YASUKE. Kurze Mitteilung über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [Brief report on the relation between flowering time and position of the flower on the inflorescence to seed weight in rice.] Bot. Mag. Tōkyō 34: 136-139. 1 fig. 1920.

351. YAMAGUCHI, YASUKE. Über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [The relation of flowering time and the position of the flower on the inflorescence to seed weight in rice.] Ber. Ohara Inst. Landw. Forsch. 1: 451-517. 35 fig. 1919.

352. YASUI, KONO. Genetical studies in *Portulaca grandiflora*. Bot. Mag. Tôkyô 34: 55-65. Pl. 1 (colored), fig. 1. 1920.—Crosses are described between single and double races belonging to 7 color types. Doubleness is dominant. Yellow is due to a yellow flavone derivative, which in the presence of a reducing factor *R* yields a magenta anthocyanin. White races lack either the chromogen factor *C* alone or both *C* and *R*. Yellow single by white single $CCrr \times ccRR$ gives magenta $F_1 CcRr$ and F_2 by selfing of 9 magenta, 3 yellow, and 4 white. Hybrid double magentas $CcRrDd$ by white singles $ccRRdd$ give magenta doubles, magenta singles, white doubles, and white singles in equal numbers. By yellow $\frac{1}{2}$ single they give equal numbers of yellow and magenta ($CcRrDd \times CCrrdd = 1CCRrDd : 1CcRrDd : 1CCrrdd : 1Ccrrdd : 1CCrrDd : 1CerrDd : 1CCrrdd : 1Cerrdd$). Double whites $CcRrDd$ by pale yellow singles $CCrrdd$ give equal numbers of magenta and yellow doubles and singles. Single scarlet by double white gives magenta double, which mated to single white gives equal numbers of magenta and white doubles and singles. The selfed singles from this give singles only; the selfed doubles, 3 doubles to 1 single. The single mated to the doubles give 1 : 1 ratio.—L. L. Burlingame.

353. ZELENY, CHARLES. The direction and frequency of mutation in a series of multiple allelomorphs. [Abstract.] Anat. Rec. 20: 210-211. 1921.—Full eye, bar eye, and ultra-bar eye in *Drosophila melanogaster* constitute a series of multiple allelomorphs with decreasing facet number and increasing dominance. Bar arose from full and ultra-bar from bar. Observations were made of the direction and frequency of mutation within pure stocks of the members of the series. In the full-eye stocks no mutations to bar or ultra-bar were observed during a period of 6 years among 46,290 counted individuals and among a much larger number of uncounted ones. On the other hand, the reverse mutation from bar to full occurred 52 times among 84,159 individuals or once in 1618, and from ultra-bar to full 5 times out of 8681, or once in 1736. Correspondingly there were only 3 mutations of bar to ultra-bar, including the original mutant, among 84,159 individuals or 1 in 28,053, while the reverse mutation of ultra-bar to bar occurred 3 times in 8681 or once in 2894 and was observed also at another time when the number of individuals examined was not being recorded. Selection for high and low facet number had no effect upon the frequency of any of the mutations.—In this allelomorphic series therefore (1) reverse mutations are much more frequent than the original ones, (2) original progress to ultra-bar is through bar but reversion may go back directly to full as well as through bar, and (3) the frequency of mutation is independent of upward and downward selection.—Charles Zeleny.

354. ZINN, JACOB. On variation in Tartary buckwheat, *Fagopyrum tataricum* (L.) Gaertn. Genetics 4: 534-586. 11 fig. 1919.—This publication records the results of a study of a highly variable, ever-sporting race of *Fagopyrum tataricum* Gaertn. discovered by the author. A strain was isolated which produced a large number of flowers with supernumerary carpels, the number of carpels varying from the normal 3 to as high as 25. The frequency of abnormal flowers as a rule decreased with increase in number of carpels. In those flowers having more than 6 carpels there was a tendency for an even number of carpels to occur more frequently than an odd number. Associated with the abnormal gynoeceia are abnormal perigones with segments varying from the normal 5 to as high as 18. There is some correlation between abnormal number of carpels and abnormal number of perigone segments. The proportion of abnormal flowers in a given race depends on the environment and is very constant under a given set of environmental conditions. The condition of nutrition had little or no effect on this ratio but high temperature and humidity seemed to increase the proportion of abnormal flowers. Selection for 5 years had no effect on the ever-sporting race. The greatest abnormal development occurred on the 3 lower branches and in the basal region of the terminal raceme. Other variations noted, which seemed to be of the same type, were floral proliferations, often giving rise to syncarpous fruits and fasciation of vegetative parts.—T. O. Sprague.

355. ZINN, JACOB. Wheat investigations. 1. Pure lines. Maine Agric. Exp. Sta. Bull. 285. 49 p., 3 pl., 8 fig. 1920.—In 1916, 259 pure lines of wheat were planted at Aroostook

Farm. These had been taken from local fields devoted to following varieties or groups: Red Fife, Preston, Bluestem, Marquis, Canada Red (Ladoga), unnamed, and durum. In 1917 these were reduced to 91. Seven pure lines secured from Minnesota were added. These were Marquis, Bluestem, Preston (Velvet Chaff), Royaltan (red and white), and two durums. Minnesota lines showed 19 per cent increase in kernel weight when grown one year in Maine. No further increase was secured.—Preston kernels from Minnesota lines showed slight tendency to yellow berry while similar tendency in durum was very strong when grown under Maine conditions.—Variations in yield among various pure lines were rather marked.—Minnesota pure lines showed but slight loss in crude protein content, except durum lines which showed marked loss. Taking the 40 pure lines grown and analyzed in 1917 and 1918, the correlation coefficient of protein content was 0.381 ± 0.092 .—Certain Red-Fife lines gave satisfactory yields and best baking results. Preston and Bluestem lines gave reasonably good results. Marquis and Canada-Red lines were rather disappointing. Durum lines and certain unnamed ones were poorest.—*L. R. Waldron*.

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 14, 213, 523, 526, 543, 577, 593, 601, 621, 659, 706, 707)

FRUITS AND GENERAL HORTICULTURE

356. ALLEN, W. J. An experiment with table grapes on sultana stock. *Agric. Gaz. New South Wales* 31: 600. 1920.—Judging by the yield, grafting trials showed that Corrichon and Ohanez vines do better by 50 per cent on their own stock than when grafted on sultana stock.—*L. R. Waldron*.

357. ALLEN, W. J., S. A. HOGG, AND W. LEGAY BRERETON. Orchard notes. *Agric. Gaz. New South Wales* 31: 599-600, 677-678, 748-750, 830-831, 898-900. 1920.—Practical suggestions of a timely nature are given upon care of orchards and products therefrom.—*L. R. Waldron*.

358. ANONYMOUS. Delmas pecan. *Amer. Nut Jour.* 12: 44. 1920.—The original Delmas pecan tree was grown from a nut planted by A. G. Delmas at Seranton, Mississippi, about 1877. The nut is large to very large in size, oblong ovate, has 4 conspicuous ridges, and is of good cracking quality. It has plump, straw colored kernels of rather soft texture and good quality.—*E. L. Overholser*.

359. ANONYMOUS. Fertilizing effects of sulphur on vines. *Cyprus Agric. Jour.* 15: 190-191. 1920.—This article is a summary of results secured by M. JEAN CHANZET, a French investigator, from an experiment undertaken to ascertain the action of sulphur upon the cultivation and yield of vines grown in the open. Two series of experiments were conducted, the 1st of which was designed to study the effect of sulphur without manure and the 2nd its effect with manure. The former gave an increase of over 25 per cent and the latter an increase of 27 per cent.—*W. Stuart*.

360. ANONYMOUS. Increasing leaf growth by perforating the root. *Sci. Amer. Monthly* 2: 14. 1920.—Experiments by MARIO CALVINO in Cuba are concerned, in which horizontal perforations of the primary root of cabbage, lettuce, parsley, etc., resulted in more luxurious development of the heads; and injections of nutritive solutions into the trunks of sterile pear trees caused them to bear again.—*Chas. H. Otis*.

361. ANONYMOUS. **Largest and best equipped walnut packing house.** Amer. Nut Jour. 13: 73. 1920.—The La Puente Valley Walnut Growers Association has established at La Puente, California, a walnut packing house three times as large as any other, and it has all modern facilities for grading, cleaning, and packing.—*E. L. Overholser.*

362. ANONYMOUS. **Metodos de transplantar coqueiros.** [Methods of transplanting coconuts.] Bol. Agric. Nova Goa [Portuguese East India] 1: 95-97. 1919. Popular.—*J. A. Stevenson.*

363. ANONYMOUS. **One hundred million native pecan trees.** Amer. Nut Jour. 12: 55. 1920.—BURBANK's statement is quoted in which the possibilities of pecan culture in the south, especially in Texas, are emphasized. Pecan trees make a prolific growth in western Texas and come into bearing the 1st or 2nd year after transplanting.—*E. L. Overholser.*

364. ANONYMOUS. **The pruning and care of young apple trees.** Better Fruit 15: 3-4. 1920.—Specific detailed directions are given for pruning from the time of planting to the bearing age. The protection of young trees from windstorms, snow, and ice is discussed.—*A. E. Murnceek.*

365. ANONYMOUS. **Spanish chestnuts.** Cyprus Agric. Jour. 14, 15: 146-148. 1919, 1920.—The Agricultural Department of Cyprus since 1900 has distributed several thousand Spanish chestnuts free of charge to villagers in the hills. It has been found that most of the trees begin fruiting in the 4th year. A large well-grown tree is claimed to yield in a season fruit worth as much as £5.—*W. Stuart.*

366. ANONYMOUS. **Wolford pecan.** Amer. Nut Jour. 12: 44. 1920.—Propagation of this variety in localities other than McKinney, Texas, where it originated is recommended. The yield, very good quality, and excellent cracking quality compensate to a considerable extent for the medium, or slightly below medium, sized nuts and the fact that the tree is a rather slender grower.—*E. L. Overholser.*

367. ANONYMOUS. [Rev. of: FLETCHER, S. W. **Strawberry growing.** Rural Science Series. xxii + 325 p. New York: The Macmillan Company: New York, 1917.] Sci. Prog. [London] 14: 510. 1920.

368. BARKER, B. T. P. **A survey of west of England farm orchards.** Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 110-121. 1919.—Results are given of a study of orchard conditions in the Counties of Devon, Gloucester, Somerset, Wiltshire, and Worcester.—*W. H. Chandler.*

369. BARKER, B. T. P., AND A. H. LEES. **Factors governing fruit-bud formation. II. The normal annual growth of the apple and pear.** Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 85-92. 1919.—Results are given of observations and experimentation concerning the growth of the different buds on a twig. On a Vicar of Wakefield pear, buds had pushed out enough to be measured by March 14. Up to April 12 there was little difference in the amount of growth from the different buds, but after that time the terminal buds gained precedence. The author's results suggest that this difference among the buds is partially explained, but not entirely so, by the work of LOEB, according to which growth of the apical bud depresses the growth of buds back of it, either by the use of the available nutrients or by the formation of a substance that, moving backward, inhibits growth at the other buds. By examining the buds in winter and the same ones again when growth had started it was found that weak dormant buds produce weak growth in spring. The authors think that the growth of a bud is influenced by (a) temperature, (b) inhibition effect suggested by Loeb, (c) bud strength, (d) root action, (e) variety influence.—*W. H. Chandler.*

370. BARKER, B. T. P., AND A. H. LEES. **Factors governing fruit-bud formation. III. The effect of notching and ringing on apple trees.** Ann. Rept. Agric. and Hort. Res. Sta.

Univ. Bristol 1919: 93-98. 1919.—A general discussion is presented of the practises of ringing and notching with a preliminary report on some experiments. Rings of varying widths were made on main trunks and branches, and knife-edge rings on twigs. Ringing, if portions of bark were actually removed, caused the dormant buds below the ring to grow. More buds pushed out as a result of May ringing than as a result of July ringing. Knife-edge ringing on the twigs caused buds to grow into spurs or shoots on which the basal bud made the most growth. Notching above a bud caused the latter to make more growth than that made by similar buds not so notched. Notching below a bud keeps the latter dormant.—*W. H. Chandler.*

371. BARKER, B. T. P., AND G. T. SPINKS. Fruit breeding investigations. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 76-84. 1919.—A statement of breeding work in progress with apples, plums, cherries, currants, gooseberries, raspberries, and strawberries.—*W. H. Chandler.*

372. BATCHELOR, L. D., AND D. C. WYLIE. Treating frosted trees. Amer. Nut Jour. 13: 14. 1920.—Trees not badly frosted should be cut back to good healthy tissues, allowed to grow, and the new growth thinned out in the fall. The same principle should be applied in the case of badly frosted trees. A good vigorous shoot below the frosted area is selected, and the tree cut back to about 1 inch above this shoot. All other shoots on the trunk are removed. Wounds are immediately sealed with a thick mixture of linseed oil and white lead. This mixture is preferred to the black asphaltum wound dressings.—*E. L. Overholser.*

373. BIXBY, W. C. Nut notes at Baldwin, New York. Amer. Nut Jour. 13: 12. 1920.—Observations made on specimens at the Arnold Arboretum showed that in some respects the shellbark is more closely akin to the pecan than to the hickories in spite of the great resemblance, in leaves and fruit, to the shagbark and mockernut. In case of northern varieties now propagated, no definite information is available as to whether they bear an abundance of both staminate and pistillate flowers, and whether or not the latter mature at the same time. Consequently, several varieties should be planted to insure good crops.—*E. L. Overholser.*

374. BIXBY, W. G. Propagated hickories. Amer. Nut Jour. 13: 70-71. 1920.—Experiences of nut growers in breeding and propagating the hickory are reviewed. The author concludes: ". . . am convinced that as soon as we can furnish the fine hickories we have in commercial quantities, they will command prices equal to those paid for the finest pecans."—*E. L. Overholser.*

375. BÖRNER. Denkschrift zur Organization der Rebenzüchtung in Deutschland. [Memorial paper on the organization of vine breeding in Germany.] Mitteil. Deutsch. Landw. Ges. 35: 689-692. 1920.—The author outlines the problems, the methods of procedure, and gives an estimate of the cost of maintaining a selection garden. The total cost of this type of work in Germany is also estimated.—*A. J. Pieters.*

376. BULLARD, W. P. Pecan standards, brands and marketing. Amer. Nut Jour. 13: 34, 47. 1920.—The "Brand method" is claimed to be best. The advantages of a cooperative organization such as the National Pecan Growers' Exchange are detailed.—*E. L. Overholser.*

377. CHEVALIER, A. Sur l'origine des pommiers à cidre cultivés en Normandie et en Bretagne. [The origin of cider apples cultivated in Normandy and Brittany.] Compt. Rend. Acad. Sci. Paris 171: 521-523. 1920.—The 500 to 1000 varieties of cider apples in northwest France yield a crop which in a good year is valued at 500 million francs. The history of apple culture in Normandy and Brittany is given. It is held that the varieties have arisen from the four elementary species of *Malus communis*, namely, *M. acerba*, *M. dasycphylla*, *M. praecox*, and *M. prunifolia*, either directly or through crosses with the small fruited varieties of Asia, such as *M. baccata*.—*C. H. Farr.*

378. COVILLE, FREDERICK V. **The influence of cold in stimulating the growth of plants.** Jour. Agric. Res. 22: 151-160. Pl. 20-35. 1920.—Such woody plants as the blueberry taken into a warm greenhouse in autumn refused to grow, although plants left out in the cold through the winter grew at once on being taken into such a greenhouse. A single freezing would not cause them to grow, but a prolonged chilling, even above the freezing point, would do so. When only a portion of the plant was chilled, that portion only started into growth on being brought into a warm room. The author thinks that "during the process of chilling the starch grains stored in the cells of the plant are at first separated by the living and active cell membranes from the enzyme that would transform the starch into sugar, but when the plant is chilled the vital activity of the cell membrane is weakened so that the enzyme 'leaks' through it, comes in contact with the starch, and turns it into sugar." He thinks that when the plant finally starts to grow without having been chilled the same principle applies, the membrane separating starch from the enzyme being weakened. The same principle is believed to apply when seeds are benefited by stratification.—*W. H. Chandler.*

379. DEMAREE, J. B. **Some precautions in top-working pecan trees.** Amer. Nut Jour. 13: 74. 1920.—Several reasons are given for preferring coal tar for sealing up wounds. An admixture of creosote is recommended because of its greater penetrating and antiseptic properties. Applications should be repeated after two or three months, and as frequently thereafter as may seem necessary.—*E. L. Overholser.*

380. DEMING, W. C. **Plant black walnut.** Amer. Nut Jour. 13: 10. 1920.—The author takes exception to BLEY's statement and advocates the planting of black walnut along roadsides.—*E. L. Overholser.*

381. EDWARDS, C. L. **Selling standard pecans.** Amer. Nut Jour. 12: 27. 1920.

382. EDWARDS, C. L. **Transforming native to cultivated pecans in Texas.** Amer. Nut Jour. 12: 9, 13. 1920.

383. FORKETT, C. **Pecan breeding.** Amer. Nut Jour. 12: 69. 1920.—A report on crossing Columbian, Success, Russel, Schley and Pabst varieties. Since most of the trees have not come into bearing no definite results are given.—*E. L. Overholser.*

384. GIMINGHAM, C. T., AND O. GROVE. **Trial cider orchards.** Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 99-109. 1919.—A description of conditions and treatments in some trial orchards in Devon, Gloucester, Monmouth, and Somerset Counties.—*W. H. Chandler.*

385. HOOVER, M. H. **The farms by the side of the road.** Amer. Nut Jour. 13: 38-39, 46. 1920.—Economic and conservation considerations emphasize the unrealized national asset of nut trees planted along roadsides.—*E. L. Overholser.*

386. HOWARD, H. L. **More about root stocks.** Monthly Bull. Dept. Agric. California 9: 93-95. 1920.—The French prune makes very poor union with the apricot root. Japanese pear stock is more resistant to pear blight than the French stock and successfully resists attack of woolly aphis. Some of the Siberian seedlings give great promise as regards blight resistance. By bench-grafting long scions of Surprise pear on Japanese roots the trunks and bases of main branches are obtained blight resistant.—*E. L. Overholser.*

387. ISBELL, C. L. **Pecans on Piedmont soil in Alabama [U. S. A.].** Amer. Nut Jour. 13: 69. 1920.

388. JONES, J. F. **Pecans, other than those of the well-known sections.** Amer. Nut Jour. 12: 25, 30. 1920.—In its natural range the pecan is found farther north along the Mississippi in Iowa and Illinois than elsewhere in the U. S. A. Best varieties, like Marquardt and Witte,

were selected for northern propagation. Iowa has a climate which is colder than that of the same latitude farther east, and pecan trees there are hardier and have to mature fruit in a shorter season. These considerations are important in selecting varieties for northern planting.—*E. L. Overholser.*

389. LEWIS, C. I. Sites and soils for small fruits in the Northwest. *Better Fruit* 15³: 6, 17-18. 1920.—Adaptation of the various sections and localities of the Northwest to the commercial cultivation of the different varieties of small fruits is considered in detail. A rather heavy soil and fairly humid climatic conditions are of particular importance to the successful growing of almost all small fruits, the strawberry being a marked exception in this respect.—*A. E. Murneek.*

390. LITTLEPAGE, T. P. Black walnut for roadsides. *Amer. Nut Jour.* 13: 10. 1920.

391. LUCKS, R. Ueber die Zusammensetzung, insbesondere über den Stärkegehalt, einiger Reisigarten. [Concerning the composition, in particular the starch content, of certain kinds of prunings.] *Landw. Jahrb.* 35: 585-615. 1919.—The author calls attention to the possible value as fodder of the prunings from vines, fruit trees, and from certain shade trees. Twigs collected in December were studied with reference to general chemical composition, and microscopically to determine relative starch content and lignification of walls. The following species were used: *Acer platanoides*, *A. pseudoplatanus*, *A. negundo*, *Aesculus hippocastanum*, *Betula verrucosa*, *Populus virginiana*, *Pirus communis*, *P. malus*, *Tilia platyphyllos*, *Ulmus campestris*, and *Vitis vinifera*. The estimated starch content was least in *Betula verrucosa* and greatest in *Vitis vinifera*. The relative lignification of the cell walls was least in *Tilia platyphyllos* and greatest in *Ulmus*. The paper is accompanied by several plates showing photomicrographs of cross sections and starch grains in various species.—*A. J. Pieters.*

392. OWEN, T. F. Budded tree campaign in Texas. *Amer. Nut Jour.* 13: 7. 1920.

393. PATTERSON, J. H. Cost and development of pecan unit orchards. *Amer. Nut Jour.* 13: 36. 1920.—The ideal development of a pecan orchard requires rich soil enriched each year by ploughing under legumes. Under these conditions the orchard will yield a paying crop in 10 years.—*E. L. Overholser.*

394. PEARCY, K. Timely notes on Oregon nut growing. *Better Fruit* 15⁴: 12, 24. 1920.—A general discussion is presented on filbert growing in Oregon. Varietal differences are emphasized. Some of the main commercial varieties appear to be self-sterile. Investigations conducted at present by the Oregon Agric. Exp. Sta. may throw some light on the pollination problem in the filbert.—*A. E. Murneek.*

395. RAMSEY, F. T. Some of the older varieties of pecans of Texas origin. *Amer. Nut Jour.* 13: 67-68. 1920.—Reviews are presented of the important varieties, giving dominant characteristics. Instances are cited to show that varieties from the arid western regions when grown farther east under more humid atmospheric conditions decline, both as to health of the trees and size and plumpness of the nuts.—*E. L. Overholser.*

396. RASMUSSEN, P. M. Pecans in California. *Amer. Nut Jour.* 12: 30. 1920.—The best nuts of Fresno County are grown at Selma, which is also a promising district for the walnut and almond.—*E. L. Overholser.*

397. READ, F. W. The new shipping-point inspection service on fruits and vegetables. *Monthly Bull. Dept. Agric. California* 9: 371-374. 1920.—The inspection work is being undertaken by the Standardization Service at terminal marketing points. A certificate of inspection is issued which includes details of car storage and condition and quality of pack and fruit. The certificate is receivable as prima-facie evidence in the courts of the State.—*E. L. Overholser.*

398. REED, C. A. Pecan varieties, grades, standard and packages. Amer. Nut Jour. 12: 82, 93. 1920.

399. REED, C. A. The status of the American nut industry. Amer. Nut Jour. 12: 41. 1920.

400. RISIEN, E. E. Sovereign pecan. Amer. Nut Jour. 12: 44. 1920.—The variety was first named "Texas prolific" and later received its present name because of its high quality. The nut is large, oblong, generally symmetrical, bright red to reddish brown in color, and has a plump kernel of fine quality.—*E. L. Overholser.*

401. SALISBURY, E. J. [Rev. of: DUKE OF BEDFORD, AND SPENCER PICKERING. *Science and fruit growing*. xxii + 351 p., 4 pl., 47 fig. MacMillan & Co., Ltd.: London, 1919.] Sci. Prog. [London] 14: 506-507. 1920.

402. SEVIER, H. Almond growers' problem. Amer. Nut Jour. 12: 30. 1920.—The problem is the development of varieties blooming late enough to escape frost. At present the only important variety which blooms late is the Drake, and even this one is not late enough to escape all frosts.—*E. L. Overholser.*

403. SIMONDS, O. C. Nut trees in landscape work. Amer. Forestry 26: 618-621. 7 fig. 1920.

404. STICKEY, H. P. Varieties of pecans for Georgia. Amer. Nut Jour. 12: 12. 1920.—The varieties Alley, Moneymaker, Moore, Pabst, Stuart, Schley, and Teeche are recommended on the basis of results obtained at the Georgia Agric. Exp. Sta. since 1903. Trees should be planted preferably 50-60 feet apart.—*E. L. Overholser.*

405. TAYLOR, R. H. The nut industry in the U. S. from a practical standpoint. Amer. Nut Jour. 12: 37-38. 1920.—At present commercial culture of the almond is limited largely to California, which produces 99 per cent of the total crop. Commercial production of walnuts in the U. S. A. is at present largely confined to the Pacific coast, in fact largely to California, which at present produces 96 per cent of the domestic product. Pecans, however, are best produced in the southern states.—*E. L. Overholser.*

406. WELDON, G. P. An old peach under a new name,—Ontario. Monthly Bull. Dept. Agric. California 9: 357-362. 1920.—The name Ontario has been substituted for Southern Tusken. It is quite distinct from the northern variety, Tusken. The Ontario is round rather flat variety, its leaf serration is more marked, a more regular bearer, has a smaller and more roundish pit with shallow convolutions, and is of much better quality than the Tusken.—*E. L. Overholser.*

407. WHITTEN, J. C. Frost control and related factors. Monthly Bull. Dept. Agric. California 8: 675-678. 1919.

408. WHITTEN, J. C. Transplanting deciduous fruit trees. Monthly Bull. Dept. Agric. California 9: 73-75. 1920.

409. WITTE, O. F. Nut culture in Ohio. Amer. Nut Jour. 12: 7. 1920.

410. WYLIE, D. C. Heavy walnut planting. Amer. Nut Jour. 12: 77. 1920.—Shortage of nursery stock is attributed to abnormal conditions created during the war, and to the attempt of the producer to meet a large increased demand. The northern black walnut (*Juglans hindsii*) is considered the best stock for grafting. The author outlines the geographical distribution of the new walnut plantations.—*E. L. Overholser.*

411. YOUNG, F. D. Smoke and direct radiation in fruit protection. Better Fruit 15: 5-6. 1920.—Reprint from California Citrograph 6: 6, 40. 1920.—A. E. Murneek.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

412. ANONYMOUS. How spring flowers can bloom unharmed in spite of frosts. *Sci. Amer.* Monthly 2: 27. 1920.

413. ANONYMOUS. Rose cultivation and extraction of rose oil in Cyprus. *Cyprus Agric. Jour.* 15: 195-196. 1920.—At Milikouri, which is the principal rose growing village, the number of rose plants has doubled in the last 3 years and the industry is extending at Pedoulas, Kykko, and Chakistra. 3000 plants were grown by the students of the School Garden at Agros. Templos, Kyrenia, and Limassol are mentioned as newly developing centers.—*W. Stuart.*

414. WARD, E. N. The cultivation of flowers for profit. *Agric. Gaz. New South Wales* 31: 894. 1920.—General suggestions are given.—*L. R. Waldron.*

VEGETABLE CULTURE

415. ANONYMOUS. How to grow your own seed. *Cyprus Agric. Jour.* 15: 178-180. 1920.—Owing to the fact that there are no reliable seed growers in Cyprus and that imported seeds are not satisfactory due to not being acclimated, farmers and gardeners are advised to raise their own seed of such crops as beans, Indian corn, lettuces, melons, peas, cucumbers, spinach, and tomato. Recommendations are given for producing high grade seed.—*W. Stuart.*

416. ANONYMOUS. [Rev. of: BOYLE, J. G. *Vegetable growing. ix + 334 p., 154 fig.* Lea and Febiger: Philadelphia and New York, 1917.] *Sci. Prog.* [London] 14: 509-510. 1920.

417. COCKERELL, T. D. A. The Girasole or Jerusalem artichoke. *Monthly Bull. State Commission Hort. California* 8: 243-250. 1919.—The Girasole, *Helianthus tuberosus*, is a native of America, is tall, erect, and has an abundance of foliage and underground tubers. The latter mature in the fall, remain in the soil during winter unaffected by frost, and are good for domestic use and as animal feed. The tubers do not contain starch but instead inulin, which for assimilation requires hydrolysis. Artificial hydrolysis may prove practicable and desirable.—*E. L. Overholser.*

418. PEDERSEN, A. Almindelig dansk Gartnerforenings Planteavls-Udvalgs Beretning for 1919. [Danish Garden Union, report of experiments, 1919.] *Gartner-Tidende* [København] 36: 77-86. 1920.—Experiments are reported with cultivation of carrots and leeks, as well as investigations on varieties of tomatoes, peas, and beans best fitted for the country.—*Ernst Gram.*

419. REED, C. A. The American nut industry as a whole. *Amer. Nut Jour.* 12: 70-71. 1920.—In the U. S. A. there are five nut organizations, all striving to stimulate nut production and consumption. The author outlines the geographical distribution in the U. S. A. of walnuts, pecans, and almonds, and points out some important considerations in the production of nuts.—*E. L. Overholser.*

420. SCHLEINITZ, MARIE FREÜN VON. Über die Zusammensetzung von Gemüse Abfall. [Composition of vegetable waste.] *Landw. Jahrb.* 35: 781-807. 1919.—The author reports extensive studies on the proportions and chemical composition of edible matter and waste in various vegetables.—*A. J. Pieters.*

421. TEMPLE, C. E. Spacing tomato plants for field spraying. [Abstract.] *Phytopath.* 10: 59. 1920.

HORTICULTURE—PRODUCTS

422. ANONYMOUS. **Charcoal from nut shells.** *Amer. Nut Jour.* 12: 7. 1920.—The California Walnut Growers' Association has decided to proceed with the installation of equipment for making charcoal out of walnut shells from the cracking plants. Of all by-products suggested the charcoal seemed the most practicable to manufacture.—*E. L. Overholser.*

423. CHRISTIE, A. W. **The University farm evaporator.** *Monthly Bull. Dept. Agric. California* 9: 125-130. 1920.—A detailed description of the evaporator is followed by a report on investigations concerning temperature, humidity, and economy. The evaporator provides better sanitation and imparts a better quality to the product than when sun dried. It also reduces the risk from adverse weather conditions. Careful handling of the product is necessary where the temperature is allowed to go beyond 170° F. as chemical decomposition may result, especially if recirculation of the air is not provided for.—*E. L. Overholser.*

424. CRUESS, W. V. **Discussion of fruit evaporation.** *Monthly Bull. Dept. Agric. California* 8: 685-688. 1919.—Properly evaporated fruits are superior to the average sun-dried article in point of quality and sanitation. They also require less sulfuring and hence have a lower sulfurous acid content. Evaporation by the circulation of artificially heated air is an economy.—*E. L. Overholser.*

425. CRUESS, W. V. **Types of evaporators.** *Monthly Bull. Dept. Agric. California* 9: 104-113. 1920.—General principle involved in evaporation of fruit and vegetables is the utilization of the high water-absorbing capacity of hot, dry air. A rise in temperature of 27° F. doubles the water-absorbing capacity of the air. Recirculation of the spent air, besides being an economy, maintains the relative humidity within a desirable range. Fruit enters the evaporator at a moderate temperature, and as it dries higher temperatures can be used, thus lessening the danger of decomposing the fruit sugars. Evaporators are placed in three classes: (1) Natural draft evaporators; (2) forced draft evaporators; and (3) distillation types, including vacuum evaporators. In a vacuum drier the large reduction of oxygen and the lower temperature give a product unexcelled by other types of evaporators.—*E. L. Overholser.*

426. GROVE, OTTO. **Cider making experiments for the season, 1918-19.** *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 14-17. 1919.—This paper reports the results of experiments in making fermented cider from mixed apples and from single varieties, and in making perry. Analyses are given of the fresh cider and of the cider after a given amount of sugar had been added. The whole had been diluted with the second pressing from the pomace, to which water had been added. Specific gravity after fermentation and alcoholic content after one year in the bottle are given.—*W. H. Chandler.*

427. GROVE, OTTO. **The relation between the rate of fermentation and the content of nitrogenous matter in apple juice.** *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 20-22. 1919.—Samples of cider from 6 varieties were fermented and analyzed for nitrogen. Those containing 0.0221, 0.0135, 0.0146, and 0.0168 per cent of nitrogen fermented regularly until only a trace of sugar was left. That with 0.0033 per cent nitrogen fermented very slightly and 6.3 per cent of sugar was left. That containing 0.0094 per cent nitrogen fermented slowly and 1.04 per cent of sugar was left.—*W. H. Chandler.*

428. GROVE, OTTO. **Some experiments on ropiness in cider.** *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 18-19. 1919.—A bacillus capable of causing ropiness in cider had previously been isolated. Eight samples of cider were inoculated with this bacillus during the summer of 1917. By early summer, 1918, 5 of these samples had developed ropiness while no uninoculated samples had done so.—*W. H. Chandler.*

429. JAFFA, M. E. **Standards for water content of dried fruits.** *Monthly Bull. Dept. Agric. California* 9: 117. 1920.—The old limit of 27 per cent of water was higher than neces-

sary; 24 per cent should be the maximum allowed for any dried fruit. Interstate trade demands uniformity of laws regarding maximum water content of fruit products.—*E. L. Overholser*.

430. NICHOLS, P. F. A brief summary of activities of the U. S. Department of Agriculture in dehydration. Monthly Bull. Dept. Agric. California 9: 133-136. 1920.—The basic principle of dehydration is the reduction of moisture to a point where bacteria, yeasts, and molds, the chief agents of spoilage, are unable to grow. Starchy and sugary vegetables and fruits generally do not show spoilage until a moisture content of 25-30 per cent is reached. The optimum temperature for the spoilage organisms is 70-98° F.; some grow below 70 and few above 100° F. The Indian meal moth (*Plodia interpunctella*) is most common and destructive insect pest found in the dried products.—*E. L. Overholser*.

431. TUFTS, W. P. The Oregon tunnel evaporator. Monthly Bull. Dept. Agric. California 9: 131-133. 1920.—The temperature is allowed to rise gradually from 90 or 100 to 120 or 140° F., and the finishing temperatures vary from 160 to 185° F., the process generally requiring 24-36 hours. A strong objection to this type of drier is that the fruit can be examined only in the last stages of evaporation. However, it has been found that the circulation of air is such that fruit dries almost perfectly in proportion to the distance from the fire.—*E. L. Overholser*.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 97, 391, 512, 573, 657, 688)

432. ANONYMOUS. [Rev. of BEAUVISAGE, L. Contribution à l'étude de la famille des Ternstroemiaceées. (Contribution to the anatomical study of the Ternstroemiaceae.) Thésis Doct. de Science, Poitiers. 470 p., 229 fig. 1920.] Bull. Sci. Pharm. 27: 598-599. 1920.—The author examined more than 50 genera and found that 30 of these, generally accredited to the Ternstroemiaceae, do not actually belong to it. He believes that only *Ternstroemia*, *Adiandra*, *Schima*, *Haemocharis*, *Camellia*, *Thea*, and *Stewartia* belong to this family, and bases his opinion on an anatomical and morphological study of the plants. The general characteristics of these genera are: The flowers have 5 petals and 5 sepals, overlapping each other; numerous stamens, their meristems united with the corolla; a well developed cuticle; numerous calcium oxalate crystals; sclereids in the cortical parenchyma of the stem, in the pith, in the limb, in the sepals, in the petals, and in the pericarp. They differ from the Hypericaceae, Guttiferae, and Dipterocarpaceae in the absence of secretion channels.—*H. Engelhardt*.

433. ANONYMOUS. [Rev. of: CHAMBERLAIN, C. J. The living cycads. xiv + 172 p., 91 fig. University of Chicago Press: Chicago.] Sci. Prog. [London] 14: 507-508. 1920.

434. C., A. H. [Rev. of: ARBER, AGNES. Water plants, a study of aquatic angiosperms. 436 p., 172 fig. Cambridge Univ. Press: Cambridge, England, 1920.] Jour. Botany 58: 296-298. 1920.

435. CHIFFLOT, F. Sur les canaux sécréteurs gommifères des racines de Cycadacées, et plus particulièrement ceux du *Stangeria paradoxa* T. Moore. [On the latex ducts of the roots of cycads, and especially those of *Stangeria paradoxa*.] Compt. Rend. Acad. Sci. Paris 171: 257-258. 1920.—Twelve species of cycads representing 8 genera were studied and in only 1 case were laticiferous tubules found in all parts of the root. In this instance they did not occur in the very young rootlets and in the coralloid roots. The canals, whether they anastomose or not, are endocyclic. They are usually formed schizogenously, but in old roots may have a schizo-lysigenous origin.—*C. H. Farr*.

436. FRANGOS, G. **Self-grafting by approach.** Cyprus Agric. Jour. 14, 15: 145-146. 1919, 1920.—The union of 2 plants of *Phaseolus multiflorus* was observed by the author to have occurred some 2 feet above the ground, from which point they became joined together in 1 stem. One of the stems was cut off 3 inches below the point of union and it was found that the upper portion of the plant was able to draw its nourishment from the one on which it was self-grafted. The most interesting feature, however, was the putting forth of aerial roots at the point where the stem was cut off.—W. Stuart.

437. GRIER, N. M. **Light correlated variations of the sterile stem of Equisetum sylvaticum.** Rhodora 22: 165-167. 1920.—In a study of this species from a colony growing at Bellevue, Pennsylvania, the author makes comparisons between plants growing constantly well shaded and those receiving sunlight throughout the day. Correlation tabulations from 100 individuals of each habitat indicated that those growing in the sun had on the average a larger number of whorls to the stem, and more leaves to the particular whorl chosen for counting, and also that their stems were longer, or at least they had their whorls of leaves growing higher on the stem, than those from shady habitat.—James P. Poole.

438. HEUSSER, C. **Over de voortplantingsorganen van Hevea brasiliensis Müll Arg.** [The reproductive organs of *Hevea brasiliensis* Müll Arg.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 24. 1919.—Reprint from Arch. Rubbercult. 3: 455-515. 1919.

439. LECOMTE, HENRI. **Les canaux sécréteurs radiaux du bois.** [The radial secretory canals in wood.] Compt. Rend. Acad. Sci. Paris 171: 533-536. 1920.—Radial secretory canals are present in *Pinus*, *Picea*, and *Larix*, but absent in 11 other genera of conifers. Six genera of the Anacardiaceae are found with them and 2 without. Their occurrence in the Burseraceae is problematical. In *Spondias* the radial canals are found to connect with the longitudinal canals of the secondary wood but not with those of the pith.—C. H. Farr.

440. MAAS, J. G. J. A. **De bloembioogie van Hevea brasiliensis.** [The floral biology of *Hevea brasiliensis*.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 22. 1919.—Reprint from Arch. Rubbercult. 3: 288-312. 1919.

441. RESVOLL, THEKLA R. **En utpraeget selvbestøver.** [A distinctly self-pollinated plant.] Nyt Mag. Naturvidenskab. 56: 131-135. 4 fig. 1919.—Description of mode of self-pollination of *Epilobium anagallidifolium* Lam. by pressure of stamens against stigma.—A. Gundersen.

442. SALISBURY, E. J. **Botany.** Sci. Prog. [London] 14: 389-392, 572-575. 1920.—A brief review of some of the more important recent papers on anatomy, cytology, morphology, taxonomy, ecology and economic botany.—J. L. Weimer.

443. SOUEGÉS, RENÉ. **Embryogénie des Composées. Les premiers stades du développement de l'embryon chez le Senecio vulgaris L.** [The embryogeny of the Compositae. The first stages in the development of the embryo of *Senecio vulgaris*.] Compt. Rend. Acad. Sci. Paris 171: 254-256, 356-357. 13 fig. 1920.—The embryo of *Senecio* in its early stages of development resembles that of *Helianthus*. It is similar to other Compositae in the non-formation of octants and in the formation of the hypocotyl from the basal cell of the two celled embryo.—C. H. Farr.

444. WISSELINGH, C. VAN. **Bijdragen tot de Kennis van de Zaadhuid. Zesde bijdrage: Over de Zaadhuid der Onagraceen en Lythraceen.** [Contribution to a knowledge of the seed-coat. Sixth contribution: The seed-coat of the Onagraceae and Lythraceae.] Pharm. Weekblad 57: 77-83, 125-139. Pl. 1, 10 fig. 1920.—In the Onagraceae and Lythraceae the 2 integuments and the innermost integument and the nucellus at first are separated. In the Onagraceae, with the exception of *Epilobium angustifolium*, the cuticle generally disappears

during the development of the seed. In the Lythraceae, however, it remains. The cuticle between the 2 integuments and that between the seed-coat and the nucellus remain intact in both species. In the chalaza cork tissue is developed, which connects with the inner cuticle between the seed-coat and the nucellus. At times layers of the seed-coat develop into cork cells.—*H. Engelhardt.*

445. WISSELINGH, C. VAN. Bijdragen tot de Kennis van de Zaadhuid. Zevende bijdrage: Over de Zaadhuid van *Tropaeolum majus* L. (Tropaeolaceen), *Hypericum quadrangulum* L. (Hypericaceen) en *Ipomoea purpurea* Roth (Convolvulaceen). [Contributions to a knowledge of the seed coat. Seventh contribution: The seed coat of *Tropaeolum majus* L. (Tropaeolaceae), *Hypericum quadrangulum* L. (Hypericaceae) and *Ipomoea purpurea* Roth (Convolvulaceae).] Pharm. Weekblad 57: 575-583, 605-614. Pl. 2, 12 fig. 1920.—A survey of our knowledge, and particularly of the work of KAYSER, as to the morphological character of the seed coats in these 3 species. The presence in the young integument of cuticles which later disappear during the development of the ovule into the seed; and the history of the chalazal tissue, are especially studied. The author concludes that the chalaza should be regarded as a part of the seed coat.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entries 99, 103, 687)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 118, 123, 130, 133, 134, 142, 687)

446. CAMPBELL, D. H. Studies in some East Indian Hepaticae. *Calobryum Blumei*, N. ab E. Ann. Botany 34: 1-12. Pl. 1, 6 fig. 1920.—*Calobryum* differs in several important particulars from the Jungermanniales, with which it is usually associated. The early stages of the antheridium and archegonium are very similar, supporting GOEBEL's theory of the close homologies of these organs. There is, however, considerable variation shown, especially by the antheridium. The genus is acrogynous, i.e., the apical cell finally becomes transformed into an archegonium. This organ has only 4 rows of peripheral neck-cells, and a cap-cell may be wanting. The sporophyte differs from that of the typical Jungermanniales in having but 1 layer of wall cells, thus more nearly resembling the Sphaerocarpaceae or Marchantiales. The family Calobryaceae is well founded, and perhaps a distinct order Calobryales ought to be established.—*D. H. Campbell.*

447. FLEISCHER, MAX. Kritische Revision von Carl Müllerschen Laubmoosgattungen. [Critical revision of Carl Müller's genera of mosses.] Hedwigia 61: 402-408. 1920.—This paper (which is to be continued) forms a part of a series in which the specimens contained in the herbarium of C. MÜLLER (of Halle) are critically discussed. It consists mostly of names arranged in 2 parallel columns, the first giving Müller's determinations and the second those of the author. Determinations which required neither revision nor transference to other genera are mostly omitted. The following genera, as understood by Müller, are taken up: *Braunia*, *Harrisonia*, *Hedwigia*, *Cyrtopus*, *Bescherellia*, *Spiridens*, *Trachypus*, *Myrinia*, *Mollirete*, *Eriodon*, *Dimerodontium*, *Rozea*, *Habrodon*, *Fabronia*, *Helicodontium*, and *Schwetschkea*. Several of Müller's species are reduced to synonymy, and many new combinations are necessitated through the transference of species.—*A. W. Evans.*

448. FLEISCHER, MAX. Natürliches System der Laubmoose. [Natural classification of the mosses.] Hedwigia 61: 390-400. 1920.—The classification here proposed is based on

characters drawn partly from the sporophyte and partly from the gametophyte. In the larger divisions the sporophytic characters are emphasized; in the smaller divisions, the gametophytic. The class Musci is first divided into the 3 subclasses Sphagnales, Andreaeales, and Bryales. The first 2 of these each include a single family, but the third is further divided into the 3 groups (Reihengruppen) Eubryinales, Buxbaumiinales, and Polytrichinales. Of these groups the first embraces the following orders (Reihen): Fissidentales (1 family), Dicranales (8 families), Pottiales (4 families), Grimmiales (1 family), Funariales (5 families), Schistostegiales (1 family), Tetraphidales (1 family), Eubryales (16 families), Isobryales (21 families), Hookeriales (6 families) and Hypnobryales (12 families). The second group embraces the orders Buxbaumiales and Diphysciales (1 family each), and the third group the orders Dawsoniales and Polytrichales (1 family each).—A. W. Evans.

449. GARGEANNE, A. J. M. Über *Haplozia caespiticia* Dum. Recueil Trav. Bot. Néerland. 17: 205-217. 6 fig. 1920.—*Haplozia caespiticia*, a very rare species in the Netherlands, reaches its maximum development in late September and early October and is quickly overgrown by other bryophytes. It contains the largest oil-bodies heretofore observed in the Hepaticae. These are especially pronounced in the cells of the leaves, where they frequently take up the entire width of the cell. They occur also in the protonema but are minute or even lacking in the cells of the stem. *Haplozia caespiticia* is one of the very few Jungermanniales which produce endogenous gemmae. These are borne in hundreds at the apexes of the stem and also on the protonema; they are set free by the gelatinization of the cell walls. When germinated on peat under glass the gemmae give rise to orthotropous shoots with bilobed or even serrate leaves, instead of the roundish leaves normal to the species.—J. C. Th. Uphof.

450. LESAGE, P. Contributions à l'étude de la germination des spores de mousses. [Germination of moss spores.] Compt. Rend. Acad. Sci. Paris 166: 744-747. 1918.—See Bot. Absts. 7, Entry 433.

451. LORCH, WILHELM. Die Haube von *Polytrichum formosum* Hedw. [The calyptra of *Polytrichum formosum*.] Hedwigia 61: 346-347. 1920.—The author shows that the operculum of *Polytrichum formosum* remains closely attached to the calyptra and that both organs are thrown off simultaneously. He considers that the calyptra, thus acting as a sort of "flight organ," plays an important part in the separation of the operculum, in addition to carrying out its function of protecting the developing capsule.—A. W. Evans.

452. MACHADO, A. Notes de bryologie portugaise. [Notes on Portuguese mosses.] Bull. Soc. Portugaise Sci. Nat. 8: 43-45. 1918.—In the first part of the paper 4 mosses new to the flora of Portugal are recorded, 1 species being described as new under the name *Pottia Sampaiana*. It approaches *P. cavifolia*, var. *epilosa* Schp. and was discovered by G. SAMPÁIO in the province of Algarve. In the second part of the paper the opinion is advanced that *Hypnum lusitanicum* Schp. represents an aberrant form of *Rhynchostegium rusciforme* Br. & Schp.—A. W. Evans.

453. MALTA, N. Beiträge zur Moosflora des Gouvernements Pleskau mit besonderer Berücksichtigung des Kalksteingebietes der Welikajamündung. [Contributions to the moss flora of the Government Pskov, with special reference to the limestone region at the mouth of the Velikaia River.] 78 p., 12 fig. Riga, 1919.—This report on the bryophytes of the Government Pskov in western Russia is based on observations and collections made by the author during the years 1916 and 1917. The species occurring on limestone, on sandstone, and on clayey substrata are separately discussed, and the influences exerted on the bryophytic flora by the physical and chemical factors of the soil are clearly indicated. In the enumeration of species which concludes the work 35 hepatics, 15 peat mosses, and 206 mosses are listed with definite data regarding stations. The only new species proposed is *Bryum androgynum* Warnst., but a new var. *pleskowiensis* Malta is described under *Seligeria recurvata*. The new species and the new variety are illustrated.—A. W. Evans.

454. SØRENSEN, S. *Pterigynandrum filiforme* (Timm) Hedw. og dens vegetative formeringsformer. [Pterigynandrum filiforme and its forms of vegetative multiplication.] *Nyt Mag. Naturvidenskab*. 56: 137-148. 1 pl., 2 fig., 1 map. 1919.—The author describes propagation by gonidia and by vegetative branching in *Pterigynandrum filiforme*. His observations are based on field and herbarium studies and on experiments.—A. Gundersen.

455. WARNSTORF, C. Bemerkungen zu *Androcryphia confluens* (Tayl.) Nees in Synops. Hep. S. 471 (1844). [Remarks on *Androcryphia confluens*.] *Hedwigia* 61: 343-345. 1920.—The author's observations are based on material collected by HERZOG in the Andes of Bolivia and determined by STEPHANI as *Androcryphia confluens*. In some of the specimens he finds purplish red rhizoids, which are not supposed to occur in the genus. He comments on the systematic position of *Androcryphia* and calls attention to the fact that Stephani makes no mention of it in his published account of Herzog's Hepaticae.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 108, 128, 234, 519, 521, 661, 687)

FUNGI

456. ADAMS, J. F. *Darluka* on *Peridermium Peckii*. *Mycologia* 12: 309-314. Pl. 21. 1920.—*Darluka filum* (Biv.) Cast., parasitizing various rusts and various rust forms, including pycnia and aecia is described in detail.—H. R. Rosen.

457. ANONYMOUS. Index to American mycological literature. *Mycologia* 12: 343-346. 1920.

458. ANONYMOUS. [Rev. of: OLIVER, WADE W. Cultural studies in a case of sprue. *Jour. Amer. Med. Assoc.* 74: 27-28. 1920.] *Jour. Tropic. Med. and Hygiene* 23: 50. 1920.—From the stool, sputum, tongue, etc., was isolated a species of *Monilia* growing as a yeast. Intra-peritoneal injection into a guinea pig resulted fatally in 7 days. The fungus was reisolated from the liver and gall bladder.—E. A. Bessey.

459. BEER, RUDOLPH. On a new species of *Melanotaenium* with a general account of the genus. *Trans. British Mycol. Soc.* 6: 331-343. Pl. 8. 1920.—A species of *Melanotaenium* was found to be the cause of tumour-like swellings on the subterranean stems and leaf-structures of *Lamium album*. The fungus is described and named *M. Lamii*. A study of the cytology of the fungus shows that the hyphal cells are binucleate and the mature spores uninucleate.—W. B. McDougall.

460. BUCKLEY, W. D. A new *Discinella*. *Trans. British Mycol. Soc.* 6: 346-347. 1920.—*Discinella margarita* is described as new.—W. B. McDougall.

461. BURT, EDWARD ANGUS. The *Thelephoraceae* of North America. XII. *Stereum*. *Ann. Missouri Bot. Gard.* 7: 81-248. Pl. 2-6, fig. 1-48. 1920.—In this continuation of the monograph of the *Thelephoraceae* of North America, Burt presents a comprehensive taxonomic account of the genus *Stereum*. The treatment of this large genus of 77 accepted species includes an elaborate key to the species and under each of the American species discussed there are given the synonymy and references to literature, full diagnoses, notes on occurrence, habits, peculiarities, and citations of specimens examined. The species are arranged in sections as central-stemmed, lateral-stemmed, merismatoid, and dimidiate and effuso-reflexed species. Burt finds the difficulties of identification, experienced by many workers, greatly decreased after a thorough study and analysis of the microscopically recognizable organs or combinations of organs. Among the North American species referred to, 12 are new and 5 are newly combined. The new species

are *Stereum caespitosum*, *S. saxitans*, *S. pubescens*, *S. conicum*, *S. patelliforme*, *S. Earlei*, *S. magnisporum*, *S. spumeum*, *S. erumpens*, *S. sepium*, *S. heterosporum*, and *S. durum*. Among the new combinations *S. exiguum*, *S. radicans*, *S. craspedium*, and *S. Murrayi* were transferred from the genus *Thelephora*, and *Stereum rugisporum* from *Hymenochaete*. In addition, notes are recorded on 10 imperfectly known species and 20 excluded from the genus. Among the latter *Stereum subcruentatum* Berk. & Curtis becomes "*Aleurodiscus subcruentatus* (B. & C.) Burt, n. comb.; now included among American species, because of collections received from California and Oregon."—*S. M. Zeller*.

462. CHARDON, CARLOS E. A list of the Pyrenomycetes of Porto Rico collected by H. H. Whetzel and E. W. Olive. *Mycologia* 12: 316-321. 1920.—Sixty-five species are listed, the genera *Meliola* and *Phyllachora* being best represented.—*H. R. Rosen*.

463. ELLIOTT, JESSIE S. BAYLISS, AND HELENA C. CHANCE. The conidia and paraphyses of *Pezicula eucrita* Karst. *Trans. British Mycol. Soc.* 6: 353-354. 1 fig. 1920.—The ascospores of this fungus are not readily discharged from the asci but they germinate, often within the asci, and produce conidia very abundantly.—*W. B. McDougall*.

464. JOHNSON, MARIE E. M. On the biology of *Panus stypticus*. *Trans. British Mycol. Soc.* 6: 348-352. Pl. 9. 1920.—The sporophores of this fungus are not able to grow in the smoky atmosphere in the vicinity of iron and chemical works nor in the absence of light. They are not affected by frost and are very xerophytic. The mycelium likewise can be dried for many months and still retain its vitality.—*W. B. McDougall*.

465. JONES, FRED RUEL, AND CHARLES DRECHSLER. The development of *Urophlyctis alfaiae*. [Abstract.] *Phytopath.* 10: 65. 1920.

466. MURRILL, WILLIAM A. Light-colored resupinate polypores—II. *Mycologia* 12: 299-308. 1920.—Descriptive notes of 20 species of *Poria* are given. The following are the new species described: *P. linearis*, *P. hondurensis*, *P. Johnstonii*, *P. salicina*, *P. perextensa*, *P. hymenitcola*, *P. separans*, *P. roseitingens*, *P. Cokeri*, *P. distorta*, *P. submollusca*, *P. lignicola*, *P. montana*, and *P. arachnoidea*.—*H. R. Rosen*.

467. MURRILL, W. A. The fungi of Blacksburg, Virginia. *Mycologia* 12: 322-328. 1920.—More than 150 species of fungi are listed, most of them being fleshy forms. *Pluteus praerugosus* is described as a new species.—*H. R. Rosen*.

468. PAUL, DAVID. Note on *Marasmius Caulicinalis* (With.) Fr. *Trans. British Mycol. Soc.* 6: 344-345. 1920.—After discussing the orthography and history of the specific name the author concludes that the original spelling, *caulicinalis*, should be restored.—*W. B. McDougall*.

469. REA, CARLETON. New or rare British fungi. *Trans. British Mycol. Soc.* 6: 322-330. Pl. 7. 1920.—The following species and one variety are described as new: *Mycena atrovirens*, *Marasmius obtusifolius*, *Pluteus phlebophorus* (Dittm.) Fr. var. *albofarinosa*, *Nolanea strigosissima*, *Astrosporina fulva*, and *Urceolella Iridis*.—*W. B. McDougall*.

470. SMITH, A. LORRAIN, AND J. RAMSBOTTOM. New or rare microfungi. *Trans. British Mycol. Soc.* 6: 365-374. 1920.—*Lophodermium lineatum* is described as new.—*W. B. McDougall*.

471. TANAKA, TYÔZABURÔ. New Japanese fungi—Notes and translations—IX. *Mycologia* 12: 329-333. 1920.—The following fungi are described: *Helminthosporium papaveri* K. Sawada sp. nov., parasitic on *Papaver somniferum* in Formosa, *Fusicladium theae* K. Hara sp. nov., on leaves of *Thea sinensis*, *Mycosphaerella theae* K. Hara sp. nov., parasitic on leaves of *Thea sinensis*, *Mycosphaerella Ikedai* K. Hara sp. nov., saprophytic on leaves of *Thea sinensis*, *Meliola citricola* K. Hara sp. nov., epiphytic on leaves, branches, and fruits of *Citrus* spp., and *Gloeosporium Cartharni* Hori and Hemmi comb. nov.—*H. R. Rosen*.

472. WAKEFIELD, E. M. *Galactinia amethystina* (Phill.) Wakef. Trans. British Mycol. Soc. 6: 375. 1920.—This is the plant formerly called *Galactinia Phillipsii* (Cke.) Boud., or, still earlier, *Ascobolus amethystinus* Phill.—W. B. McDougall.

473. WAKEFIELD, E. M. The Painswick Foray. Trans. British Mycol. Soc. 6: 299-302. 1920.—The Spring Foray, which was held at Painswick, Gloucestershire, from May 21 to May 25, 1920, is described and a complete list of the fungi collected, numbering about 125 species, is given.—W. B. McDougall.

474. WAKEFIELD, E. M., AND A. A. PEARSON. Records of Surrey resupinate Hymenomycetes. Trans. British Mycol. Soc. 6: 317-321. 6 fig. 1920.—Sixteen species are listed, in most cases with descriptive notes.—W. B. McDougall.

475. WILTSHIRE, S. P. The production of conidia in pure cultures by the brown rot fungus of the apple. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 34-36. 1919.—Attempts to secure abundant production of conidia by *Sclerotinia fructigena* in pure culture are reported. Varieties of apples supposed to develop upon inoculation brown rot and abundant conidia, instead of black rot and no conidia, failed to do so.—The best medium found for production of conidia is sliced potato soaked in 7.5 per cent malic acid. Plum wood extract with 1 per cent malic acid also gives excellent production of conidia.—D. Reddick.

476. YORK, H. H. Late seasonal production of aecia of *Cronartium ribicola*. Phytopath. 10: 111. 1920.—Freshly matured aecia were found on *Pinus strobus*, on Sept. 16, 1919.—D. Reddick.

LICHENS

477. CHURCH, A. H. The lichen symbiosis. Jour. Botany 58: 213-219, 262-267. 1920.—The generally accepted teaching is that lichens consist of a fungus and an alga living very closely together in symbiotic relationship, the whole forming a "consortium." The difficulty of convincing a student that in lichens any symbiotic relation exists is noted. To determine whether mutual benefit occurs in all cases is difficult; also the consortium is ill-defined, especially in cases of symbiosis of fungi with filamentous algae and higher plants where there is a complete gradation to purely parasitic conditions. The fungi are always normal ascomycetes or basidiomycetes, and have not been modified by the association. It is the vegetative part or thallus that has been so remarkably modified by the cohabitation. The important factor is *dual control*. Simple cohabitation is not the sole factor in the consortium. Dual control is a biological futility like a house divided against itself, and, hence, doomed to rapid extinction. The alga gains little if anything from the association with the fungus. The views held by SACHS, WEST, SCHENK, and GOEBEL are discussed, it being noted that much in their statements is deductive rather than inductive. The relation of the whole question of the evolution of dorsal-ventral organs, or even axial structure, through the enormously long period of emergence from the phytobenthon of the sea is noted. Yet there is something about lichens, neither fungus nor alga, but a form factor, which produces a soma readily distinguished by the collector, and the cause of which must be found and explained. There is nothing in symbiosis to show why *Cladonia* should have a centric habit and *Parmelia* a dorsiventral habit in the same environment. Any effect of symbiosis in this matter is doubted, and the relation of lichen form to alga form is pointed out. REINKE held that the similarity of form in distinct phyla as in lichens and algae was due to the effect of similar conditions; but the conditions surrounding sea-weeds and lichens are not similar. The question is raised whether lichens, or rather the fungus part of lichens, do not actually inherit their form from algae. Lichens would thus represent a deteriorating race of algae arrested in deterioration by the intrusion of algal units of a lower degree.—K. M. Wiegand.

478. LYNGE, B. Index specierum et varietatum Lichenum quae collectonibus "Lichenes exsiccati" distributae sunt. (Forts.) [Index of species and varieties of Lichenes which were distributed in the collections of "Lichenes exsiccati." (Continued.)] Nyt. Mag. Naturvidenskab. 56: 385-464. 1919.

479. MERESCHKOVSKY, C. On some new forms of lichens. *Ann. and Mag. Nat. Hist.* 6: 482-489. 1920.—The author gives a brief description in Latin followed by one in French of the following forms of lichens: *Physcia pulverulenta*, formae *delicata*, *turgidula*, and *elegantella*, and varieties *lepidota*, *aquiloides*, and *angustata*. *Physcia virella*, formae *dendrlobata*, and *dendrlobata subforma tenerima*. *Physcia hispida*, forma *auriculata*. *Squamaria muralis*, formae *convexiuscula* and *granulata*, and var. *flezuosa*. *Parmelia conspersa*, forma *dispersa*, and varieties *diffRACTA*, *digitulata* forma *intermedia*, and *isidiata* forma *heteroclyta*. *Anaptychia ciliaris*, formae *helianthus* and *submarginata*. *Cetraria hiascens*, forma *delicatula*. *Caloplaca teicholyta*, forma *nivalis*. *Dermatocarpon aquaticum*, var. *nervosum*. *Biatora kreyeri*.—H. H. Clum.

480. PAULSON, ROBERT. Lichens found near Painswick. *Trans. British Mycol. Soc.* 6: 303-304. 1920.—A list is given of about 45 species of lichens collected near Painswick, Gloucestershire, during the Spring Foray of May, 1920, together with brief notes on habitat relations.—W. B. McDougall.

BACTERIA

481. ANONYMOUS. The rate of speed at which bacteria travel. *Sci. Amer.* 123: 441. 1920.

482. WOLF, F. A. A bacterial leafspot of velvet bean. *Phytopath.* 10: 73-80. 2 fig. 1920.—A description of a hitherto undescribed leafspot disease of Florida velvet beans caused by *Aplanobacter stizolobii* n. sp.—J. G. Dickson.

MYXOMYCETES

483. CURRIE, MARY E. A critical study of the slime-molds of Ontario. *Trans. Roy. Canadian Inst.* 12: 247-308. Pl. 8-10. 1920.—Of the 28 genera and 110 species and varieties reported from Ontario, 47 species and varieties are here recorded from Ontario for the first time, 36 of them being new to Canada. Three species and 1 variety are reported as new to North America, viz., *Badhamia foliicola* Lister, *Diachaea bulbillosa* Lister, *Stemonitis fusca* Roth. var. *confluens* Lister, and *Stemonitis flavogenita* Jahn. The plasmodia of 2 species have been noted for the first time. Five forms have been observed parasitizing fungi and 9 have been found fruiting on, and in some cases causing injury to, the leaves or stems of herbaceous plants.—R. B. Thomson.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 704, 705)

484. ANONYMOUS. Contemporaneous evolution of warm-blooded animals and of flowering plants. [Rev. of: BERRY, E. W. Evolution of flowering plants and warm-blooded animals. *Amer. Jour. Sci.* 49: 207-211. 1920.] *Sci. Amer. Monthly* 1: 558-559. 1920.

485. CARPENTIER, ALFRED. Sur quelques végétaux silicifiés des environs de Sainte-Marie-aux-Mines [Alsace]. [On some silicified plant remains in the region of Sainte-Marie-aux-Mines.] *Compt. Rend. Acad. Sci. Paris* 171: 250-252. 1920.—The rocks of this region are found to contain roots of *Psaronius*, sporanges of *Pteridotheca*, petioles of *Medullosa*, pollen of *Cordailes* and other gymnosperms, and leaves of the Cordaitales.—C. H. Farr.

486. CLARKE, J. M. The oldest of the forests. *Sci. Monthly* 12: 83-91. 6 fig. 1921.—Devonian conditions were not favorable for preserving trees. But trees, mostly fern-like, were not sparse and scattered. Until recently the richness of the Catskill hills in the relics of the Devonian forests has not been realized. An expedition this year brought 5000 pounds

of their remains for museum purposes.—A great autumn freshet of the upper Schoharie in 1869 revealed in the bed rock of the hills a series of standing stumps of trees all at the same level in the rocks and their rootlets in the original mud, now shale, thus revealing the most ancient forest yet known. These trees are preserved at least at two levels in the rock, one 60 feet above the other.—*L. Pace.*

487. HOLTENDAHL, O. Occurrence of structures like Walcott's Algonkian Algae in the Permian of England. *Amer. Jour. Sci.* 1: 195-206. *Fig. 1-8.* 1921.—Forms from the English Permian are described and illustrated that greatly resemble the Algonkian forms called *Newlandia* and *Greysonia* by Walcott, and that are considered as in all probability secondary structures and not of organic origin.—*E. W. Berry.*

488. KRÄUSEL, R. Die fossilen Koniferenhölze (unter Ausschluss von *Araucarioxylon* Kraus). Versuch einer monographischen Darstellung. [Attempt at a monographic treatment of fossil coniferous wood, exclusive of *Araucarioxylon*.] *Palaeontographica* 62: 185-275. 1919.—A monographic treatment of fossil coniferous woods, giving besides an alphabetic list of the hitherto described species (with bibliographic references, synonymy, and horizons); also a historical introductory section and a systematic synopsis of the recognizable forms (with corresponding existing forms, horizons, and localities). The author dissents from JEFFREY's view of the relationships among the coniferous families, and on the basis of histologic studies by himself and other students, holds that the *Araucariaceae* are the older and the *Abietineaceae* the younger groups. The bibliography comprises 243 titles.—*Saml. W. Geiser.*

489. KRÄUSEL, R. Palaeobotanische Notizen. *Senckenbergiana* 2: 198-215. 1920.—This communication comprises three parts. The first, p. 198-204, consists of additions to this author's recently published monograph on fossil coniferous woods (see Bot. Absts. 8, Entry 488). The second, "Zur Bestimmung fossiler Koniferenhölzer" [The determination of fossil coniferous woods], is a 4 page summary of current ideas. The third, "Über die Lignite von Senftenberg [Upon the lignite of Senftenberg], gives the results of a study of the wood structures from this Miocene horizon which is widespread in Saxony, Silesia, Mecklenburg, Mark Brandenburg, etc. The author determined the percentage representation of *Taxodium* and *Sequoia* in the lower, middle, and upper parts of the lignite in the various mines at Senftenberg, and discusses the probable ecology.—*E. W. Berry.*

490. KRAUSEL, R. Nachträge zur Tertiärflora Schlesiens. III. Über einige Originale Goepperts und neuere Funde. [Additions to the Tertiary flora of Silesia. III. Upon some of Goeppert's types and new collections.] *Jahrb. Preuss. Geol. Landes.* 40: 363-433. *Pl. 5-15.* 1920.—This paper concerns itself with Goeppert's types and with new collections from Ruppertsdorf, Peruschen, Oppatowitz, and Bluschau. No new forms are described but the older determinations are revised. Species in the following genera are discussed: *Woodwardia*, *Pteris* (2), *Salvinia*, *Pinus*, *Taxodium*, *Glyptostrobus*, *Sequoia*, *Taxodioxylon*, *Libocedrus*, *Widdringtonia*, *Salix* (2), *Populus* (2), *Myrica*, *Juglans* (3), *Hicoria*, *Pterocarya*, *Carpinus*, *Betula* (2), *Castanea*, *Quercus*, *Ulmus* (2), *Zelkova*, *Cinnamomum*, *Persea*, *Philadelphus*, *Liquidambar*, *Platanus*, *Crataegus*, *Rhus*, *Acer* (4), *Paliurus*, *Vitis*, *Grewia*, *Buettneria*, *Cornus*, and several undetermined types. All are of Miocene age, those from Bluschau and Oppatowitz being regarded as older than Schosnitz (Tortonian) and those from Peruscher being regarded as younger (presumably Sarmatian).—*E. W. Berry.*

491. LOZANO, E. D. Depositos diatomiferos en el valle de Toxi, Ixtlahuaca, Estado de Mexico. [The diatomaceous deposits of the Toxi Valley, Mexico.] *An. Inst. Geol. Mexico* 9: 1-19. *Pl. 1-5.* 1920.—The author describes the diatomaceous deposits of the valley of Toxi and records and figures diatoms representing the genera *Synedra*, *Surirella*, *Coscinodiscus*, *Cyclotella*, *Gaillonella*, *Encyonema*, *Epithemia*, *Navicula*, and *Pleurosigma*. The deposits were laid down subsequent to the volcanic rocks of the region and are considered of fresh water origin and Pleistocene age.—*E. W. Berry.*

492. REID, E. M. *Recherches sur quelques graines pliocènes du Pont-de-Gail (Cantal).* [Studies of Pliocene seeds from Pont-de-Gail, Cantal.] Bull. Soc. Géol. France IV, 20: 48-87. Pl. 3-4. 1920.—Total number of varieties reported is 48 of which 37 are positively determined and 17 of these are new and include species of *Sparganium*, *Stratiotes*, *Carpinus*, *Fagopyrum*, *Ranunculus*, *Menispermum*, *Polanisia*, *Myriophyllum*, *Symplocos*, *Lycopus*, *Sambucus*, *Trichosanthes* and a new genus, *Didicodarya*, of unknown botanical affinity and also present in the Pliocene of Holland. The age is considered to be lower Pliocene and the flora contains a large exotic and extinct element with a pronounced southeastern Asiatic and North American facies. There is an elaborate discussion, the gist of which has already been given in the abstract of this author's subsequently published paper on Pliocene floras. A complete bibliography and two plates complete the paper.—E. W. Berry.

493. REID, E. M. *Recherches sur quelques graines pliocènes de Pont-de-Gail (Cantal).* [A study of the Pliocene seeds of Pont-de-Gail.] Compt. Rend. Sommaire Soc. Geol. France 6: 49-51. 1920.—Seeds of 48 species of plants from the lower Pliocene of Central France are recorded. Of these, 18 are new and 5 are exotics now dwelling in southeastern Asia. A detailed account is promised in a future publication.—E. W. Berry.

494. STOPES, M. C. *Paleobotany in 1918.* Sci. Prog. [London] 14: 396-398. 1920.—A brief review of the most important papers published in this field during 1918.—J. L. Weimer.

495. THIESSEN, R. *Structure in Paleozoic bituminous coals.* U. S. Bur. Mines Bull. 117. 296 p., 160 pl. 1920.—This paper gives the results of several years study of coal structures. A historical summary is followed by an account of the methods of study. The origin and structure of modern peat is discussed and it is shown that coal had a similar origin and shows comparable structure and plant content. The coals described in detail comprise samples from Pennsylvania, West Virginia, Indiana, Illinois, Iowa, and Alabama, all from bituminous mines and of Carboniferous age. Coal is shown to consist of the three elements long recognized, namely, the charcoal, or "mother of coal," and compact coal, the latter consisting of alternating laminae of dull coal (matt, cannelloid, sapanthrakon) and bright bands (glanz, humus, jet, carbohumus, lignitoid, hydrocarbon), the anthraxylon of the author. The dull laminae are shown to be made up of former woody parts in a more finely divided state than in the bright bands and imbedded in a ground mass of finely divided debris which the author calls the *attritus*. The *attritus* consists chiefly of woody degradation products along with traces of cuticles, spore and pollen exines, and resinous particles of various origins. The bright laminae are shown to consist largely of small chips of semi-decayed woody tissues. Many plant fragments of various plant parts and a variety of exines are discussed and figured but no attempt is made to assign names to any of them except a *Medullosa* stem, which is identified as *Medullosa anglica*. The report is profusely illustrated.—E. W. Berry.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 8, 15, 25, 54, 158, 173, 181, 386, 397, 456, 459, 475, 476, 482, 483, 611, 612, 675, 678, 682, 688)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

496. ANONYMOUS. *Chemistry in plant distribution.* Sci. Amer. Monthly 1: 562-563. 1920.—The use of methyl red to indicate whether or not a soil is sufficiently acid to grow scab-free potatoes is explained.—Chas. H. Otis.

497. ARTHUR, J. C. *Two destructive rusts ready to invade the United States.* [Abstract.] Phytopath. 10: 65-66. 1920.

498. GRAYATT, G. F. The chestnut blight in the southern Appalachians. *Amer. Forestry* 26: 606-607. 1920.—It is predicted that the chestnut growth of the southern Appalachians will be killed off just as the growth from New York south to southern Virginia is being killed.—*Chas. H. Otis*.

499. JOHNSON, A. G., J. G. DICKSON, AND HELEN JOHANN. An epidemic of *Fusarium* blight (scab) of wheat and other cereals. [Abstract.] *Phytopath.* 10: 51. 1920.

500. LYMAN, G. R. The 1919 survey for potato wart. [Abstract.] *Phytopath.* 10: 60-61. 1920

501. STEVENS, F. L. Foot-rot of wheat and its fungous associates. [Abstract.] *Phytopath.* 10: 52. 1920.

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY)

502. ANONYMOUS. *Bladrullesyge hos Tomater*. [Leaf-roll of tomatoes.] *Gartner-Tidende* [København] 36: 123. 1920.—The rolling of the leaves often seen in tomatoes cannot be compared to the leaf-roll of potatoes, but is a reaction following heavy pruning. Individual plants or certain forms may be more inclined to roll than others.—*Ernst Gram*.

503. FRANGOS, G. A vine plant immune to *Oidium*. *Cyprus Agric. Jour.* 15: 146. 1920.—A vine plant on the Heloan Farm at Alethrico was observed in August, 1919, to be quite free from mildew (*Uncinula necator*) while all the others were badly affected. Inquiry regarding the source of this vine revealed the fact that it had been obtained from Ayios Ambrosios and was known as "Laorcas." It is proposed to test thoroughly the persistency of immunity of the vine to *Oidium*.—*W. Stuart*.

504. FROMME, F. D. The development of loose smut of wheat as modified by soil fertility. [Abstract.] *Phytopath.* 10: 53. 1920.

505. HODSON, E. R. Is American chestnut developing immunity to the blight? *Jour. Forestry* 18: 693-700. 1920.—The chestnut blight does not appear controllable by ordinary methods but observations appear to show that immunity is developing or that individuals are resistant. As the chestnut sprouts at the base, the organism may live for two or three decades and in this period immunity, which is the only hope for forest stands, may actually develop. Two types of canker are recognized, atrophy, a depressed surface, and hypertrophy, a swollen distorted condition. In the first the plant makes no resistance to the disease, while in the second there is resistance to the invader. Immunity development requires time, of which the apparent recovery of living tissue after a long period of attack appears to be evidence. Long-time observations under forest conditions of actual developments are necessary to determine whether the hypothesis is substantiated.—*E. N. Munnis*.

506. HOLBERT, J. R., JAMES G. DICKSON, AND H. HOWARD BIGGAR. Correlation of early growth variation and productivity of maize as influenced by certain pathologic factors. [Abstract.] *Phytopath.* 10: 57-58. 1920.

507. JOHNSON, A. G., AND W. W. MACKIE. Evidence of disease resistance in barley to attacks of *Rhynchosporium*. [Abstract.] *Phytopath.* 10: 54. 1920.

508. JONES, L. R., J. C. WALKER, AND W. B. TISDALE. Fifth progress report of *Fusarium*-resistant cabbage. [Abstract.] *Phytopath.* 10: 64. 1920.

509. McCLINTOCK, J. A. Field tests with strains of wilt-resistant tomato seed in 1919. [Abstract.] *Phytopath.* 10: 59. 1920.

510. MELCHERS, L. E. The resistance shown by three hard winter wheats, Kanred (P762), P1066, and P1068 to plant diseases. [Abstract.] *Phytopath.* 10: 52. 1920.

511. MELCHERS, LEO E., AND JOHN H. PARKER. The resistance of Kanred (P762), P1066, and P1068, three hard winter wheats, to leaf rust. [Abstract.] *Phytopath.* 10: 52-53. 1920.

512. RUMBOLD, CAROLINE. Causes for the production of pathological xylem in the injected trunks of chestnut trees. *Phytopath.* 10: 23-33. 2 pl. 1920.—The author concludes that the production of pathological xylem in the phloem region of the trunks of injected chestnut trees [*Castanea dentata*] is due to (1) the mechanical severance of vascular tissues, and (2) the chemical stimulation of cells.—J. G. Dickson.

513. WOODWORTH, C. M., AND FLORENCE COERPER BROWN. Studies on varietal resistance and susceptibility to bacterial blight of the soy bean. [Abstract.] *Phytopath.* 10: 68. 1920.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

514. CLAYTON, E. E. The relation of soil temperature to the development of the tomato *Fusarium* wilt. [Abstract.] *Phytopath.* 10: 63-64. 1920.

515. HUNGERFORD, CHAS. W., AND A. E. WADE. Relation between soil moisture and bunt infection in wheat. [Abstract.] *Phytopath.* 10: 53. 1920.

516. JONES, L. R., AND H. H. MCKINNEY. The influence of soil temperature on the development of potato scab. [Abstract.] *Phytopath.* 10: 63. 1920.

517. MACINNES, JEAN. The effect of temperature and light on *Fusarium* sp. causing wheat scab. [Abstract.] *Phytopath.* 10: 52. 1920.

518. ROSENBAUM, J. Infection experiments on tomatoes with *Phytophthora terrestris* Sherb. and a hot water treatment of the fruit. *Phytopath.* 10: 101-105. 1920.—The writer found that because of its effect on zoospore liberation, an abundant moisture supply in diseased soil is necessary to produce an epidemic infection with *P. terrestris*. The addition of copper sulphate solution (1:5000) to infested soil prevented infection of green tomatoes when in contact with the soil. The immersion of green tomatoes in water at 60°C. for 1½ minutes prevents spread of the rot where the infection is very recent and the fungus has not penetrated deeply into the tissues.—J. G. Dickson.

519. ROSENBAUM, J. Studies with *Macrosporium* from tomatoes. *Phytopath.* 10: 9-22. 2 pl., 1 fig. 1920.—A study of the early blight, or "nail head" spot, of the tomato is summarized, the author drawing the following conclusions: Infection takes place without previous injury to the fruit, however only on the immature fruit; the disease does not originate in transit on mature fruit picked from an infected field, but it may develop in transit on immature fruit picked from infected fields; the disease does not spread from infected fruit to adjacent healthy fruit in transit. The author concludes that the causal organism of the "nail head" spots on fruits, stems, and leaves of the tomato is different specifically from *Macrosporium solani* from potatoes and suggests the use of the binomial *M. tomato* Cooke.—J. G. Dickson.

520. TISDALE, W. B. The relation of soil temperature and soil moisture to the occurrence of cabbage yellows. [Abstract.] *Phytopath.* 10: 63. 1920.

521. WHITE, J. H. On the biology of *Fomes applanatus* (Pers.) Wallr. *Trans. Roy. Canadian Inst.* 12: 133-174. Pl. 2-7, fig. 1-2. 1920.—The investigations have followed along three main lines of inquiry: (1) The study of the morphology and ecology of *F. applanatus* and of the action on its host; (2) a determination of etiological relationships by culture methods, and a testing of the applicability of such methods to a study of timber destroying

fungi; (3) a search for possible criteria by which parasitic attacks on wood may be distinguished from saprophytic action. The particular type of decay in timber due to *F. applanatus* has now by actual culture been linked with its causal agent. The species has been proved to be a wound parasite, in southern Ontario one of the commonest and most destructive. The occurrence of wound gum and the multiplication of tyloses in a band marking the advance of a wood destroying fungus in a living tree would appear to furnish an unerring criterion for the recognition of a fungus as a parasite.—*R. B. Thomson.*

522. WILTSHIRE, S. P. **The apple canker fungus.** Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 23-29. 1919.—*Nectria ditissima* ejects its ascospores so that pure cultures were obtained by the inverted plate method. Mature perithecia were secured on malt extract agar in tubes.—Critical temperatures for the fungus in culture are: Minimum about 5°, optimum, 20-22°, maximum about 30°C.—Infection through young buds was very abundant in 1918. The spores and mycelium were found abundantly on bud scales in September but it is not yet established that the fungus penetrates in the absence of injury. Infections about galls produced by woolly aphids were confined to those that had broken open.—*D. Reddick.*

DESCRIPTIVE PLANT PATHOLOGY

523. ANONYMOUS. **Gulbladede Hortensier.** [Yellows of Hydrangea.] Gartner-Tidende [København] 36: 139. 1920.—Hydrangea should be planted in rather light soil not too rich in manure. The yellows may be caused by too heavy soil, presence of manure, drought, or starvation.—*Ernst Gram.*

524. BENNETT, C. W. **Phoma root-rot of celery.** [Abstract.] Phytopath. 10: 67. 1920.

525. BROWN, NELLIE A., AND R. B. HARVEY. **Heart rot, rib rot, and leaf spot of Chinese cabbages.** Phytopath. 10: 81-90. 4 fig. 1920.—The Chinese cabbage (*Brassica pekinensis* and *B. chinensis*) is subject to the black rot disease of the common cabbage produced by *Bacterium campestris*, and, as in the common cabbage, there may be also a rapid secondary infection by a soft rot organism. High temperature and excessive moisture favor the development of the disease. Control measures are suggested.—*J. G. Dickson.*

526. BURGER, O. F. **Decay in citrus fruits during transportation.** Monthly Bull. Dept. Agric. California 9: 365-370. 1920.—Lemon decay (due to *Phomopsis citri*), a disease new to California lemons, was found in California during the season 1919-20. The writer discusses the economic importance of stem-end rot and blue-mold decay on citrus fruits in transportation. Stem-end rot infection takes place in the field. To insure sound fruit the disease should be eliminated from the groves. Proper methods of handling, packing, and shipping are given for blue-mold decay control.—*E. L. Overholser.*

527. BYARS, L. P. **A disease of red clover and strawberry in the Pacific Northwest caused by the nematode *Tylenchus dipsaci* (Kühn) Bastian.** [Abstract.] Phytopath. 10: 66. 1920.—See Bot. Absts. 8, Entry 528.

528. BYARS, L. P. **A nematode disease of red clover and strawberry in the Pacific Northwest.** Phytopath. 10: 91-95. 2 pl. 1920.—A disease caused by *Tylenchus dipsaci* is described. [See Bot. Absts. 8, Entry 527.]—*J. G. Dickson.*

529. CHEN, CHUNJEN C. [A study of American cotton diseases.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 14: 245-256. 1920.—The cause, symptoms, means of transmission, and control of the following important cotton diseases are reviewed: Angular leaf spot, anthracnose, wilt, root-knot, potash-hunger, damping-off, root rot, Diplodia boll rot, shedding of bolls and squares, and leaf spot. The reduction in cotton yield in the United States due to diseases is discussed and statistics are given. The author also points out the

possibility of introduction of serious diseases into China through the large importation of American cotton seeds, and urges the Chinese cotton growers to practise the precaution of seed fumigation.—*Chunjen C. Chen*.

530. COOK, MEL. T. The *Alternaria* fruit rot and *Rhizoctonia* stem rot of tomatoes. [Abstract.] *Phytopath.* 10: 59. 1920.

531. COOK, MEL. T. Blossom blight of the peach. [Abstract.] *Phytopath.* 10: 64-65. 1920.

532. COOK, O. F. A disorder of cotton plants in China: Clubleaf or cyrtosis. *Jour. Heredity* 11: 99-110. 1 pl., fig. 1-9. 1920.—A disease of the mosaic type is described as being destructive to cotton in China. Diseased plants develop a large number of shoots which give them a "witches' broom" appearance. The nodes are short and the leaves small and crinkled, often colored different shades of green, yellow, and red. The disease is believed to be infectious. Leafhoppers are suspected as agents of dissemination.—*C. W. Bennett*.

533. CROMWELL, RICHARD O. Recent studies on *Septoria* of wheat. [Abstract.] *Phytopath.* 10: 51. 1920.

534. DELACROIX, JORGE. Enfermedades de las plantas cultivadas. Enfermedades no parasitarias. [Diseases of cultivated plants. Non-parasitic diseases.] 12 × 18 cm., 392 p., 57 pl. Casa Editorial, P. Salvat: Barcelona, 1920.—A Spanish translation from the French edition, published as part of the "Enciclopedia Agricola."—*John A. Stevenson*.

535. DELACROIX, JORGE, Y ANDRÉS MAUBLANC. Enfermedades de las plantas cultivadas. Enfermedades parasitarias. [Diseases of cultivated plants. Parasitic diseases.] 12 × 18 cm., 457 p., 87 pl. Casa Editorial, P. Salvat: Barcelona, 1919.—A Spanish translation from the second French edition, published as part of the "Enciclopedia Agricola."—*John A. Stevenson*.

536. DURRELL, L. W. The purple sheath spot of corn. [Abstract.] *Phytopath.* 10: 54-55. 1920.

537. GLOYER, W. O. Apple blister canker. [Abstract.] *Phytopath.* 10: 58. 1920.

538. HARTLEY, CARL, AND GLENN G. HAHN. Notes on some diseases of aspen. *Phytopath.* 10: 140-147. 3 fig. 1920.—*Populus tremuloides* is found in certain regions to be unusually subject to disease. Trunk cankers in these regions seem to be important factors in shortening the life of the trees. *Fomes igniarius* is a frequent cause of premature death. The occurrence is also noted of (1) a twig blight suggesting in appearance the fire blight of pear; (2) leaf killing by *Sclerotium bifrons* E. & E., found in both the East and the West, and also attacking Lombardy poplar; (3) a bark blackening of obscure origin which prevents propagation by cuttings.—*Carl Hartley*.

539. HARVEY, R. B. Some enemies of the potato. *Sci. Amer. Monthly* 2: 120-122. Fig. 1-9. 1920.—The mechanism by which the hyphae of the "damping-off" fungus, *Pythium deBaryanum*, push through a cell wall barrier is described. Experimenting with slices of potato 3 or 4 cells thick and watching the process through the microscope, it was found that a hypha penetrates the cell wall in 5 minutes. The author believes that this is entirely too short a time to account for the breaking down of the cell wall by enzyme action. Zoospore dispersal of *Phytophthora infestans* is also illustrated.—*Chas. H. Otis*.

540. HOLBERT, J. R., AND G. N. HOFFER. Corn root and stalk rots. [Abstract.] *Phytopath.* 10: 55. 1920.

541. JONES, FRED RUEL. *Pythium* as a causal factor in "pea blight." [Abstract.] *Phytopath.* 10: 67. 1920.

542. McCUBBIN, W. A. **A heart rot of peach.** [Abstract.] *Phytopath.* 10: 65. 1920.
543. MORRIS, R. T. **Hazel nuts.** *Amer. Nut Jour.* 12: 57. 1920.—The fungus *Cryptosporella anomata* (Sacc.) appears to be the only factor preventing the successful introduction of foreign hazels into the U. S. A., though other enemies are also present. A depressed area in the bark with a swollen overhang of healthy bark around the margins characterizes infections by hazel blight. Effective control is possible by removing diseased tissues and spraying with Bordeaux mixture.—*E. L. Overholser.*
544. NEAL, DAVID C. **Phony peaches: A disease occurring in middle Georgia.** *Phytopath.* 10: 106-109. 1 pl., 1 fig. 1920.—A disease of peach at present restricted to the peach belt of middle Georgia, U. S. A., and frequently confused with "collar edema," is here described under the name common among growers. The disease is characterized by vivid green leaves which are larger than normal and hang on short, stubby branches. "As a result, the entire head of the tree is reduced to a rather compact shape, owing to the foreshortened internodes and resulting close spacing of the leaves." The amount of fruit set is small, low in quality, and late in ripening. All varieties have been found affected. The disease, the etiology of which is not discussed, has been found on 6-year-old seedlings.—*G. H. Coons.*
545. ORTON, W. A. **Streak disease of potato.** *Phytopath.* 10: 97-100. 1 pl., 1 fig. 1920.—Streak first appears on upper full grown leaves as elongated or angular spots which follow the veinlets and extend into the parenchyma. Longitudinal streaks soon appear on the petiole, which soon collapses; the hanging dead leaves are characteristic. Following this the stem turns brown and dies, beginning at a point below the tip. Tubers are not affected except as the period of growth is shortened. There is discoloration in cortex. Varieties Factor (European), Rural New Yorker, and many hybrid seedlings are susceptible. American varieties are more resistant than are European. Attempts to isolate a pathogenic organism from lesions have failed. The disease is not to be confused with advanced stages of leaf-roll or mosaic. It has been seen in northern U. S. A. from coast to coast but has not become more prevalent in 7 years.—*Donald Reddick.*
546. REDDY, C. S., AND W. E. BRENTZEL. **Flax canker, a non-parasitic disease.** [Abstract.] *Phytopath.* 10: 66-67. 1920.
547. ROSENBAUM, JOSEPH. **A stem disease of tomato caused by *Macrosporium solani* E. and M.** [Abstract.] *Phytopath.* 10: 59. 1920.
548. SPENCER, E. R. **Black crust of Brazil nuts.** [Abstract.] *Phytopath.* 10: 61. 1920.
549. STOVER, W. G. **Some results of corn root rot work in Ohio.** [Abstract.] *Phytopath.* 10: 55. 1920.
550. WANG, K. W. [Some cotton diseases.] *Khu-Shou [Science-Publ. Chinese Sci. Soc.]* 5: 1057-1062. 1920.—Diseases of cotton reviewed as to their causes and symptoms are yellow leaf blight (*Macrosporium nigricantium*), leaf spot, shedding of bolls, angular leaf spot (*Bacterium malvacearum*), wilt (*Fusarium vasinfectum*), damping-off (*Rhizoctonia* sp.), anthracnose (*Glomerella gossypii*), root rot (*Ozonium omnivorum*), leaf blight (*Mycosphaerella gossypina*), areolate mildew of cotton (*Ramularia areola*), boll rot (*Bacterium* sp.), and root knot (*Heterodera radicola*). A list of literature cited is also appended.—*Chunjen C. Chen.*
551. WILTSHIRE, S. P. **A dieback of red currants.** *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 30-33. 1919.—Branches of red currant suddenly wilt and die. This may happen at any time but is most noticeable in July. Cortex and wood of affected plant are infested with mycelium. *Cytosporina ribis* and *Nectria cinnabarina* have been isolated in culture and both are under test.—*D. Reddick.*

ERADICATION AND CONTROL MEASURES

552. ANONYMOUS. Certification of stocks of varieties of potato which are immune from wart disease. Scottish Jour. Agric. 3: 52-66. 1 pl. 1920.—The Board of Agriculture of Scotland has undertaken the enforcement of regulations prohibiting the planting of susceptible varieties in infected lands and is inspecting fields of immune varieties for certification as to varietal purity. No crop is certified which contains more than 0.5 per cent of rogues. Over 17,000 acres of approved immune varieties were certified in 1919. Distinguishing characters of immune varieties and common rogues are given.—H. V. Harlan.

553. ANONYMOUS. Beispiele erfolgreicher Beizung. [Examples of successful seed treatment.] Mitteil. Deutsch. Landw. Ges. 35: 616. 1920.—A brief note giving the results from treating rye with "Uspulin" and with "Fusariol" against *Fusarium* as reported by Dr. STEHER, Lübeck, in Zeitschr. Landw. Kammer Braunschweig. Based on a check plot treated with "Uspulin," a loss of 44,800 marks occurred on the untreated portion of the field. Fusariol treatment also resulted in large increases of grain and straw.—A. J. Pieters.

554. BARKER, B. T. P., C. T. GIMINGHAM, AND S. P. WILTSHIRE. Sulfur as a fungicide. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 57-75. 1919.—Polysulfides possess fungicidal properties and act as contact fungicides. Tests of the decomposition products of polysulfides show that elemental sulfur is the essential fungicidal ingredient of the decomposed solutions. Spores of parasitic fungi are inhibited in germination by the presence of sulfur in hanging drops in the following order: *Sclerotinia fructigena* and *Phragmidium subcorticium*, 100 per cent inhibition; *Cladosporium fulvum*, *Fusicladium dendriticum*, *F. pyrinum*, 50 per cent; *Nectria ditissima*, *Botrytis cinerea*, and *Verticillium* sp. no inhibition.—The acid or alkaline reaction of secretion from germinating spores has no correlation with susceptibility to sulfur, although precipitated sulfur seems to be brought into solution by the secretions of various fungi and apparently to some extent by agar when used as a medium for germination.—D. Reddick.

555. CADORET, A. Les sulphatages après le 15 juillet. [The sulphates after July 15.] Prog. Agric. et Vitic. 70: 9-10. 1918.—From investigations conducted since 1877, it is quite definite that the critical period for infection of *Plasmopara* on the grape (*Vitis vinifera*) is from July 10 to July 15. During this period the vines should be well covered. If the weather continues wet after July 15, a copper spray should be applied every 8 to 12 days. In dry seasons a monthly application is sufficient. In sections where black rot (*Guignardia*) is epidemic, as was the case in 1918, the entire period is longer and it may be necessary to employ 1 per cent Bordeaux mixture from June 10 to harvest-time.—H. B. Smith.

556. COONS, G. H. Experiments on the control of stinking smut of wheat. [Abstract.] Phytopath. 10: 54. 1920.

557. GIMINGHAM, C. T., AND G. T. SPINKS. Soil sterilization. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 37-42. 1919.—Soil infested with *Chrysophlyctis endobiotica*, the cause of potato wart, was placed in small pots and the following substances incorporated with it in the amounts indicated: Bleaching powder 1 gram, creosote 0.5 gram, chloro-picrin 0.3 gram, formalin 1 cc., powdered chalk 1.5 gr. (to neutrality) and 7.5 gr., "cymène" 0.25 gr. Steam-sterilized soil was used as a control. One week later a tuber was planted in each pot. At the same time other pots of the soil were planted and were moistened twice each week with the following solutions: Copper sulfate 2 per cent, sulfur dioxide 0.1 saturated solution, formalin 1 per cent, bleaching powder 1 per cent. Aside from steam sterilization the only agents which reduced the amount of disease to any appreciable extent were copper sulfate, excess of chalk, and perhaps creosote.—Experiments in progress with disinfectants for the control of *Rhizoctonia* on carrots and spinach were discontinued because of the disappearance of the disease. Bleaching powder at the rate of 2 ounces per sq. yd. can be used safely for carrots. When 8 ounces are used severe injury results.—D. Reddick.

558. GLOYER, W. O. Effect of straw mulch on potato leaf roll. [Abstract.] Phytopath. 10: 60. 1920.

559. GRAM, E. Uspulum som Afsvampningsmiddel. [Uspulum as a seed disinfectant.] Ugeskrift Landmaend [København] 65: 636. 1920.—“Uspulum” (mercuric salt of monochlorophenol) has been somewhat overestimated by certain writers and does not in the Danish experiments equal the standard treatments for cereal smuts and barley stripe. The supposed acceleration of the germination should be more thoroughly investigated before the chemical is recommended.—*Ernst Gram*.

560. HANSEN, H. J. Brugen af modstandsdygtige Stammer af Kaalroer og Turnips paa kaalbroksmitten Jord. [Resistant strains of swedes and turnips on club-root ground.] Tidsskr. Freavl [Roskilde] 9: 85–86. 1920.—The author directs attention to the fact that many farmers order resistant strains although they may not have club-root in their fields. The resistant strains are the highest yielders only on contaminated ground, and should be used only there.—*Ernst Gram*.

561. HOPKINS, E. F. Overwintering and control of bur clover leaf-spot. [Abstract.] Phytopath. 10: 66. 1920.

562. KEITT, G. W. A preliminary report on apple scab and its control in Wisconsin. [Abstract.] Phytopath. 10: 58. 1920.

563. KUNSTLER, J. Sur un traitement préventif de l'oidium. [On a preventative treatment for oidium.] Compt. Rend. Acad. Sci. Paris 171: 406–407. 1920.—The dusting of the leaves with flowers of sulfur is recommended.—*C. H. Farr*.

564. MARTIN, WILLIAM H. Sulfur experiments for the control of potato scab. [Abstract.] Phytopath. 10: 60. 1920.

565. SPINKS, G. T. Spraying trials. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 43–45. 1919.—Varieties of apples and pears susceptible to scab [*Venturia*] were sprayed once just before the blossoms opened. Little scab developed on the unsprayed trees. Bordeaux mixture, copper stearate and Burgundy mixture proved equally effective in controlling the diseases but the latter caused injury to foliage.—*D. Reddick*.

566. STOVER, W. G., F. H. BEACH, AND T. H. PARKS. Results of spraying the apple for blotch in Ohio in 1919. [Abstract.] Phytopath. 10: 58. 1920.

567. TEMPLE, C. E. Tomato spraying experiments for the control of Septoria. [Abstract.] Phytopath. 10: 60. 1920.

568. VILLEDIEU, G. De l'action des eaux météoriques sur les dépôts des bouillies cupriques. [The action of rain water on deposits from copper spraying materials.] Compt. Rend. Acad. Sci. Paris 171: 260–263. 1920.—It is found that zoospores of downy mildew [*Plasmopara viticola*] live well in acid media but do not develop in the presence of alkali. It is therefore desirable to have spraying mixtures such that H_2SO_4 will not be generated when the sulfur compounds brought down by rain mix with the spray deposits on the leaf.—*C. H. Farr*.

569. WALKER, J. C. Occurrence and control of black leg of cabbage. [Abstract.] Phytopath. 10: 64. 1920.

570. WESTERDIJK, JOHANNA. Das Spritzen der Kartoffeln in den Niederlanden. [Spraying potatoes in the Netherlands.] Jahresber. Ver. Angew. Bot. 16: 132–138. 1918.—A résumé of the present status of potato spraying in Holland.—*P. J. Anderson*.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

571. BLAIR, R. J. Wood destroying fungi in pulp and paper mill roofs. [Abstract.] Phytopath. 10: 61. 1920.

572. BOAS, I. H. The preservation of timber in structures. Australian Forest. Jour. 3: 209-212. 1920.—The decay of timber, preservative treatment, and the necessity for proper sanitation in yards are briefly discussed.—*C. F. Korstian*.

573. HARTLEY, CARL. Abnormal growth induced by chloral hydrate soil treatment. Phytopath. 10: 334-335. 1 fig. 1920.—The addition of small amounts of chloral hydrate to sandy soil resulted in very abnormal growth of seedlings of *Pinus ponderosa*. The plants during their first few weeks are distinctly larger than normal, and the cotyledons, and in some cases also the first leaves formed, were attached to each other to form sheaths. The same phenomenon, but to a much less marked degree, has been observed in pine seedlings in autoclaved mixtures of soil and compost.—*Carl Hartley*.

574. HUNTOON, F. A., P. MASUCCI, AND EDITH HAMUN. Antibody studies. Part 3. [A preliminary report on the chemical nature of bacterial antibodies.] Jour. Amer. Chem. Soc. 42: 2654-2661. 1920.—The antibody molecules are of large size and of colloidal nature. They are unaffected by the enzyme trypsin. They are not precipitated by solutions containing little or no electrolyte. Antibodies are not soluble in ether, nor are they precipitated by a short exposure to 30 per cent NaCl. Dilute alkalies or dilute acids do not injure them. Temperatures as high as 60°C. do not injure them, but they are altered by higher temperatures.—*J. M. Brannon*.

575. KOTILA, J. E. Leaf hoppers and hopperburn of potato leaves. [Abstract.] Phytopath. 10: 61-62. 1920.

576. LEEFMANS, S. Kenmerken van bliksemslag bij klappers. [Symptoms of lightning in coconut trees.] In *De Klappertor*. [The coconut beetle.] Mededeel. Lab. Plantenz. Dept. Landb. Nijv. en Handel [Buitenzorg] 41: 46-47. Pl. 15. 1920.—Three groups of lightning-injured coconut palms are described, one illustrated by a photograph, to distinguish between lightning injury and beetle injury. One of the groups included 12 trees. The injury involved the sharp drooping of the older leaves, excentric injury to the top, apparently burned lesions with a "scorched" odor, scars running down the trunk and in some cases gum exudation from splits in the lower part of the trunk. The younger leaves which did not immediately droop were apparently scorched at their bases. Natives testified that the trees had been struck by lightning.—*Carl Hartley*.

577. LEES, A. H. Big bud. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 50-56. 1919.—Big bud of currant is caused by a mite which lives in the interior of the buds. During April, May, and June it is migrating to new buds. Boskoop Giant, introduced as a variety immune to big bud, has proved to be one of the most susceptible. "French" has had a somewhat similar history. Seabrook's Black remains relatively free from big bud in Chelmsford but is affected at Long Ashton. Apparent immunity in Chelmsford is really extreme susceptibility which results in early death of terminal bud and its replacement by a lateral bud. Chelmsford has a dry summer, Long Ashton a moist one. This is thought to affect the growth of the plants sufficiently to account for the differences noted.—*D. Reddick*.

578. RUMBOLD, CAROLINE. Giving medicine to trees. Sci. Amer. Monthly 2: 114-116. 5 fig. 1920. [Reprinted from Amer. Forestry 26: 359-362. 1920.]—See Bot. Absts. 6, Entry 1284.

579. RUTGERS, A. A. L. Bliksemschade bij Hevea. [Lightning injury in Hevea.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 18. 1919.—Reprinted from the Arch. Rubbercult. 3: 163-171. 1919.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 135, 604, 631)

580. ANONYMOUS. The eradication of weeds. Agric. Gaz. New South Wales 31: 881. 1920.—Attention is called to poison tulip (*Homeria collina*), known to have toxic properties.—*L. R. Waldron.*

581. CABANNES, E. Contribution à l'étude des propriétés physiologiques et de la posologie du *Geranium maculatum*. [Contribution to the study of the physiological properties and the dosage of *Geranium maculatum*.] Bull. Sci. Pharm. 27: 22-25. 1920.—It was found that therapeutically valuable preparations can be made from the plant and that it may be used as a substitute for rhatany and at times for ergotin, cinchona, and calumba.—*H. Engelhardt.*

582. DELAUNEY, P. Extraction de glucosides de deux Orchidées indigènes; identification de ces glucosides avec la Loroglossine. [The extraction of glucosides from two orchids and the identification of these glucosides as Loroglossine.] Compt. Rend. Acad. Sci. Paris 171: 435-437. 1920.—A glucoside found in *Orchis Simia* and *Ophrys aranifera* proves to be identical with Loroglossine found, in 1919, in *Loroglossum hircinum*. The various tests are applied.—*C. H. Farr.*

583. GONNERMANN, M. Der Eisengehalt der Öle, Fette, Wachsarten, Harze, Gummiharze, Gummiarten; sowie einige Analysen über den Gehalt an Kieselsäure und Tonerde. [The iron content of oils, fats, waxes, resins, gum-resins, and gums; also some analyses of silicic acid and alumina content.] Biochem. Zeitschr. 95: 286-295. 1919.—The analyses include materials from animal and vegetable sources, many of the latter being of pharmaceutical interest. Senegal gum appeared to be the only plant material which showed no iron content. The other substances of plant origin showed iron in quantities ranging from a trace to 29.7 per cent.—*W. W. Bonns.*

584. GORIS, A., ET VISCHNIAC, CH. Constitution du primevérose, de la primevérine et de la primulavérine. [Constitution of primeverose, primeverin and primulaverin.] Bull. Soc. Pharm. 27: 67-70. 1920.—From *Primula officinalis* two glucosides, primeverin and primulaverin, and a sugar, primulaveroase, have been isolated. Primeverin yields on hydrolysis primeverose and the methyl ester of beta metoxyresorcylic acid, while primulaverin is split up into the same sugar and the methyl ester of metametoxysalicylic acid. Primeverose is composed of glucose and xylose.—*H. Engelhardt.*

585. GREENISH, HENRY G. Gum Arabic and senna. Pharm. Jour. 105: 448-449. 1920.—Gum Arabic is obtained almost exclusively from *Acacia vereke* distributed throughout the African sub-desert from Senegal to Erythraea. Gum is yielded only by those trees located in soil which becomes thoroughly dry during the dry season, only on the younger branches where the cork is thin, and only after wounding or piercing of the bark. It apparently not only serves to seal the wound but also to retain moisture for the p'ant. All of the nice grades of the gum are obtained from trees artificially wounded or "tapped." Experiments on propagation and the influence of various methods of tapping are under way. Senna is obtained from wild and cultivated plants of *Cassia acutifolia*, but wild plants of *Cassia angustifolia* and *Cassia obovata* are common. Leaflets from cultivated plants are somewhat thinner, narrower, and more elongate than from the wild plants.—*E. N. Gathercoal.*

586. GUERIN, P., ET A. GORIS. Une nouvelle plante a coumarine: *Melittis melissophyllum* L. [A new source for coumarine: *Melittis melissophyllum*.] Compt. Rend. Acad. Sci. Paris 170: 1067-1068. 1920.—Coumarin is produced by the leaves of this plant, which is related to the official lavender, which also produces it.—*C. H. Farr.*

587. HOLMES, E. M. **Note on Uzara.** Pharm. Jour. 105: 507. 1920.—The plant yielding the root constituting this proprietary preparation appears to be *Schizoglossum Shireense*, N. E. Brown, described in Kew Bull. Miss. Inf. 1895: 253. 1895.—E. N. Gathercoal.

588. VAN KETEL, B. A. **Een nieuwe methode voor de quantitative bepaling van werkzame bestanddeelen in grondstoffen, in het bijzonder in Kinabast.** [A new method for the quantitative estimation of the active principles in drugs and especially in cinchona bark.] Pharm. Weekblad 57: 650-651. 1920.—The following method, which, as the author believes, very probably can be adapted for the estimation of the alkaloids in other plants also, has given good results in the estimation of cinchona alkaloids. Four to 5 gms. of the powdered cinchona bark are mixed with slaked lime and triturated with sufficient ammonia water to obtain a granular mass. This is extracted with chloroform in an extraction apparatus and the solution is evaporated to dryness. As an alternative process the author recommends extracting the mixture of bark, lime, and ammonia with benzene.—H. Engelhardt.

589. LECLERC, H. **La verveine (Verbena officinalis).** [Vervain (Verbena officinalis).] Bull. Sci. Pharm. 27: 104-109. 1920.—A short description of this and allied plants and a history of their use in therapeutics.—H. Engelhardt.

590. MASSY. **Les goudrons végétaux sur le marché de Meknès (Maroc).** [The vegetable tars on the market at Meknès (Morocco).] Jour. Pharm. et Chimie 21: 433-439. 1920.—A chemical study of the tars gatrane er-rekik obtained from the cedar tree, gatrane er-relid obtained from *Thuja*, amine obtained from a tree which probably is *Juniperus phoenicea*, and oil of cade obtained from *Juniperus oxycedrus*.—H. Engelhardt.

591. NETOLITSKY, F. **Eine Methode zur makrochemischen Untersuchung von Zellinhaltskörpern.** [A method for the macroscopic study of cell inclusions.] Biochem. Zeitschr. 93: 226-229. 1919.—Pulverized plant material was shaken with inactive liquids of high specific gravity (chloroform, carbon tetrachloride, bromoform). The differential sedimentation afforded a means of separating the materials to be examined (crystals, cystoliths, hairs, etc.) from the impurities in the plant powders.—W. W. Bonns.

592. MOOYEN, A. M. **Het Urson en zijne verspreiding in het plantenrijk.** [Urson and its occurrence in the vegetable kingdom.] Pharm. Weekblad 57: 1128-1142. 1920.—All plants of the Ericaceae contain urson, which is also present in various species of *Epaeris*, in crowberry, and in four species of ivy. Urson has the empirical formula $C_{23}H_{47}O_4COOH$, forms a well-crystallized methylester and crystallizable potassium and sodium salts. It does not possess a double bond nor does it contain hydroxyl, ketonic, aldehydic, or methoxylic groups.—H. Engelhardt.

593. ROTHEA, F. **Toxicité des coques de cacao dans l'alimentation des chevaux et du bétail.** [Toxicity of cacao shells when used as feed for horses and cattle.] Bull. Sci. Pharm. 27: 355-356. 1920.—A number of cases of poisoning of horses and other domestic animals were traced to the presence of as much as 0.7 per cent of theobromine and 0.26 per cent of caffeine in the shells. Therefore, only shells from which the alkaloids have been extracted should be used, and it is recommended that such shells be fed only in mixtures with other feed.—H. Engelhardt.

594. TANRET, G. **Les alkaloides du grenadier.** [The alkaloids of pomegranate.] Bull. Sci. Pharm. 27: 486-493. 1920.—The author discusses and criticizes the work of Hess and EICHEL on this subject and sustains the view of CH. TANRET in regard to the chemical constitution of the various alkaloids in pomegranate.—H. Engelhardt.

595. URK, H. W. VAN. **Bijdrage tot de kennis van Peucedanum sativum (Pastinaca sativa L.) II Mikrochemie en Anatomie.** [Contribution to the knowledge of Peucedanum sativum. (Pastinaca sativa L.) II Microchemistry and anatomy.] Pharm. Weekblad 57: 883-887. Fig. 7.

1920.—The author confirms the presence of an alkaloid in garden parsley; it occurs in all parts of the plant and in those but 1 year old. The root contains a fatty and a volatile oil, together with starch; the amount of fatty oil appears to decrease with increase of starch. Fall seedlings store starch, while in spring seedlings starch is absent. Microscopically the root fibers are similar to, and indistinguishable from, those of Angelica root. An adulteration of garden parsley with Angelica root is highly improbable. *Conium* can easily be distinguished microscopically from garden parsley. It has been claimed that the juice of garden parsley produces dermatitis, but this seems to be due only to an idiosyncrasy of hypersensitive persons.—H. Engelhardt.

596. WAAL, M. DE. Onderzoek naar de insecticide kracht der composieten, in het bijzonder van *Helenium autumnale*. [Experiments in regard to the insecticidal power of the Compositae, especially of *Helenium autumnale*.] Pharm. Weekblad 57: 1100-1107. 1920.—After giving a rather complete review of the insecticidal plants now in general use, the author reports on experiments with different substances claimed to act as insecticides. As test animals, flies, bedbugs, plant-lice, fleas, and cockroaches were used and the following substances were allowed to act on them: *Sabadilla* seed, pyrethrum, cevadine, opium, extract of belladonna, cannabis, a mixture of cevadine and opium, tobacco, naphthalin, a mixture of borax and sugar, copper acetate, pomegranate, linseed flour, lupulin, blue flag root, anise oil, formaldehyde vapors, chloroform, euphorbium, white mustard seed, kamala, lycopodium, quassia, saponaria root, soap bark, and tumeric. All these substances, with the exception of *sabadilla* seed and cevadine, gave negative results. These 2 acted on the insects as does insect powder, i.e., they paralyzed the motor nervous center. An examination of more than 100 species of Compositae, grown in Holland, showed that only *Pyrethrum roseum* and *Chrysanthemum cinerariaefolium* possess insecticidal properties. Half-opened blossoms of *Helenium autumnale* exerted only a very slight power and this action is not due to the glucoside present in the flower, but to a volatile oil, pyrethron.—H. Engelhardt.

597. WALLIS, T. E. Analytical microscopy—X. Pharm. Jour. 105: 528-531. 5 fig. 1920. Micrometry and drawing are considered.—E. N. Gathercoal.

598. WESTER, D. H. Het nangaangehalte van eenige *Digitalis*-soorten van verschillende bodem, en de invloed van een mangaanbemestig. [The content of manganese in some species of *Digitalis* grown on different soils and the influence of fertilizers containing manganese.] Pharm. Weekblad 57: 660-662. 1920.—Some years ago BURMAN claimed that only *Digitalis purpurea* contains manganese and that it was not present in other species of the genus, such as *D. ambigua*, *D. lutea*, etc., and that the presence of manganese in the ash of *digitalis* could serve to distinguish the official drug from products of other species of *Digitalis*. The author, however, found that all plants of the foxglove family contain manganese. The ash of the green flowering tops of *D. purpurea* contains 0.7-0.85 per cent; the seeds 3.2-3.7 per cent; and the leaves 1.3-3.2 per cent. In the dry plant parts, the percentages of manganese in the ash are respectively 5.8-9.7, 3.5-4.1, and 6-13. In general the percentage of manganese in *Digitalis* is to be considered as low in comparison with that of other plants. Furthermore, the percentage of manganese varies considerably with the soil in which the plant grows.—H. Engelhardt.

PHYSIOLOGY

B. M. DUGGAR, *Editor*CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 12, 31, 32, 80, 342, 369, 370, 378, 412, 427, 512, 514, 515, 516, 517, 539)

GENERAL

599. ANONYMOUS. [Rev. of: ONSLOW, M. W. *Practical plant biochemistry*. vii + 178 p. University Press: Cambridge, 1920.] *Nature* 106: 176. 1920.—See Bot. Absts. 8, Entry 602.

600. ANONYMOUS. [Rev. of: ZSIGMONDY, R. *The chemistry of colloids*. (Trans. by ELLWOOD, B. SPEAR.) x + 288 p. John Wiley & Sons: New York, 1917.] *Sci. Prog.* [London] 14: 687-688. 1920.

601. MOLISCH, HANS. *Pflanzenphysiologie als Theorie der Gärtnerei*. [Plant physiology as a theory of horticulture.] 3 ed., xi + 326 p., 145 fig. Gustav Fischer: Jena, 1920.—The 2 earlier editions of this work appeared during the war, and consequently are perhaps little known to other than German readers. Further than to note a rather general revision of the book, it is necessary to outline briefly the method of treatment. Nutrition, including salt requirements, soil relations, photosynthesis, transpiration, the movement of food substances, and certain special topics, constitutes about one-third of the book; and, apparently in accord with its purpose, there is no general discussion of metabolism. After a very brief treatment of respiration, about 80 pages are devoted to growth, under which caption is included environmental relations, growth movements, organ formation, and the rest period. In this chapter particularly, many horticultural practises are analyzed. The effects of cold, freezing, are briefly presented; and this is followed by an extended chapter on reproduction, both vegetative and sexual, with ample consideration of such processes and phenomena as grafting, chimeras, parthenocarpy, stuffed flowers, etc. In the last 2 chapters there are inextensive accounts of seed germination and of variability, heredity, and plant production.—B. M. Duggar.

602. ONSLOW, M. W. *Practical plant biochemistry*. 178 p. University Press: Cambridge, 1920.—The author presents this book neither as an organic chemistry (an elementary knowledge of which is assumed) nor as a plant physiology, but rather to fill the gap which she conceives to exist between the two fields. A very brief characterization is made in the introduction to the classes of organic compounds in plants; the importance of the synthetic and condensation processes; properties associated with the colloidal state; and the significance of chlorophyll, enzymes, and the regulation and control of metabolism. Nine topics follow, namely, the colloidal state, enzyme action, carbon assimilation, carbohydrates and their hydrolyzing enzymes, the fats and lipases, aromatic compounds and oxidizing enzymes, the proteins and proteases, glucosides and glucoside-splitting enzymes, and the plant bases. In general each chapter treats in appropriate order 2 aspects of the particular topic. On the one hand there is a condensed account of the occurrence, chemical properties and other characteristics of the products included, together with practical directions for experiments on the preparation or identification of the more important groups or compounds. On the other hand brief suggestions are usually given concerning the present knowledge of the course of metabolism, especially the formation and hydrolysis (or decomposition) of the materials discussed, with suitable experiments to demonstrate the action of any enzymes catalyzing the reaction.—The biochemistry of certain special fermentation processes, respiration, and salt nutrition are among the topics not included in this work. At the end of each topic adequate references are given to texts and special articles. [See Bot. Absts. 8, Entry 599].—B. M. Duggar.

603. SAVAGE, W. G. **Food poisoning and food infections.** *viii + 247 p.* University Press: Cambridge, 1920.—This small handbook is one of the Cambridge Public Health Series published under the editorship of G. S. GRAHAM-SMITH and J. E. PURVIS. It is intended to be a reference work for the medical profession and to instruct public health and hygienic committees; but it also includes several chapters involving certain physiological relations of the bacteria, and containing data not usually assembled in bacteriological handbooks.—*B. M. Duggar.*

604. SAUVAGEAU, CAMILLE. **Utilisation des algues marines.** [Utilization of marine algae.] *394 p., 26 fig.* Librairie Octave Doin: Paris, 1920.—The fourth volume of the Encyclopédié Scientifique published under the direction of Dr. TOULOUSE has just appeared and deals in a comprehensive manner with the economic uses of sea weeds. After a general introduction on the marine algae, there is a full discussion of the kelps, including *Nereocystis*, *Macrocystis*, and *Alaria*, on the Pacific coast, together with the methods of harvesting this plant. The use of algae for fertilizers is treated in the second chapter and includes considerable valuable information as to the analysis and practical value of this material for agricultural purposes. The uses of the brown and red algae in various industries are treated at length and a short discussion of the making of paper from *Zostera* and *Posodonia* is included. There is a full summary of the information extant on the use and value of marine algae for food, and the work concludes with brief references to various other ways in which algae have been used, particularly in medicine. There are brief notes on the method of collecting and mounting algae for artistic effect, as well as some information on the cultivation of marine forms. A fairly complete bibliography on the entire subject is appended.—*George T. Moore.*

PROTOPLASM, MOTILITY

605. BAILEY, I. W. **The significance of the cambium in the study of certain physiological problems.** Jour. Gen. Physiol. 2: 519-533. 1920.—The author suggests that cambium cells furnish very desirable material for studies of certain problems such as the working sphere of the nucleus, the nucleocytoplasmic relation, the dynamics of karyokinesis, and cytokinesis. The cells are of 2 distinct types, small, nearly isodiametric cells, more or less similar to terminal meristem and embryo cells, and large, much elongated cells. The elongated cells can be induced to divide to form cells of the small type. Data are presented showing that there may be no very close relation between nuclear size, number or mass of chromosomes, and cell size.—*Otis F. Curtis.*

DIFFUSION, PERMEABILITY

606. LESAGE, PIERRE. **Expériences utilisables en physiologie végétale, sur l'osmose et sur l'aspiration due à l'évaporation.** [Experiments useful in plant physiology, on osmosis and gaseous exchange due to evaporation.] Compt. Rend. Acad. Sci. Paris 171: 358-360. 1920.—An experiment of Dutrochet was repeated using various liquids and a membrane of acetocellulose. It was found that this membrane, varying with its origin and manipulation, cannot always be depended upon to produce osmosis.—*C. H. Farr.*

607. LOEB, JACQUES. **The reversal of the sign of the charge of membranes by hydrogen ions.** Jour. Gen. Physiol. 2: 577-594. 1920.—The sign of the electrical charge on a collodion membrane treated with protein becomes positive when the hydrogen-ion concentration exceeds a certain limit. Evidence is presented showing that a film of protein adheres to the membrane, and that the hydrogen-ion concentration at which reversal of the sign of the charge on the membrane takes place, varies in the same sense as the isoelectric point of the protein used.—*Otis F. Curtis.*

608. RABER, ORAN L. **The antagonistic action of anions.** Jour. Gen. Physiol. 2: 541-544. 1920.—By the electrical conductivity method of OSTERHOUT in experiments with *Laminaria Agardhii* the author finds antagonism between anions of sodium acetate and sodium sulfate.—*L. Knudson.*

609. RABER, ORAN L. **A quantitative study of the effect of anions on the permeability of plant cells.** Jour. Gen. Physiol. 2: 535-539. 1920.—This is a contribution on the influence of anions on permeability as determined by the electrical conductivity method of OSTERHOUT. The sodium salts of sulfoeyanide, chloride, nitrate, acetate, tartrate, phosphate, and citrate were used individually in the first series of experiments in solutions of equal conductivity and in the second series at a concentration of 0.52 m. Comparing the resistance of *Laminaria Agardhii* after treatment with the individual salt solutions with the resistance of the control in sea water of the same conductivity, it was noted that citrate, phosphate, tartrate, and sulfate caused a marked decrease in resistance, while the bromide, sulfoeyanide, chloride, and nitrate were less effective.—L. Knudson.

MINERAL NUTRIENTS

610. CANALS, E. **Dosage du calcium et du magnésium dans différents milieux salins.** [The amounts of calcium and magnesium to be used in different culture media.] Compt. Rend. Acad. Sci. Paris 171: 516-518. 1920.—It is found that iron salts used in culture solutions precipitate some of the calcium and magnesium. In addition, the aluminium salts precipitate some of the magnesium. This precipitation is prevented by adding a few drops of an acid such as acetic.—C. H. Farr.

611. HOFFER, G. N., AND R. H. CARR. **I. Iron accumulation and mobility in diseased corn stalks.** [Abstract.] Phytopath. 10: 56. 1920.

612. HOFFER, G. N., AND R. H. CARR. **II. Experiments to test effects of iron salts on corn plants.** [Abstract.] Phytopath. 10: 57. 1920.

613. PFEIFFER, TH., A. RIPPEL, UND CH. PFOTENHAUER. **Über den Verlauf der Nährstoffaufnahme und Stofferzeugung bei der Gerstenpflanze.** [The course of plant food absorption and assimilation in the barley plant.] Fühlings Landw. Zeitg. 68: 81-101. Fig. 1-8. 1919.—Barley plants were planted April 3 on well fertilized land. Representative samples of the aerial parts were taken April 24, when the third leaf was forming, May 30, before heading, June 14, just headed, July 7, in the milk, and July 23 (fully ripe), and total dry matter, ash, organic matter, phosphoric acid, lime, magnesia, potash, nitrogen, and silica determined in each case. Separate determinations were made on the leaves, stems, and heads. The total dry matter increased up to harvest time. All substances in the grain were most abundant at harvest time except lime and potash, which reached maxima during the milk stage. Total ash increased up to the time of the milk stage. The ash content of the leaves and stems was highest respectively at heading time and during the milk stage. Total organic matter increased steadily to harvest time, being highest in the leaves at heading time and in the stems during the milk stage. Total phosphoric acid increased up to harvest time, being highest in the leaves before heading and in the stems at heading time. Total lime increased up to the milk stage, being highest in the leaves at heading time and in the stems during the milk stage. Total magnesia increased up to heading time, but the proportion in the stems reached its maximum during the milk stage. Total potash increased up to the milk stage, being highest in the leaves before heading. Total nitrogen increased up to harvest time, being highest in the leaves before heading and in the stems at heading time. Total silica increased up to harvest time, being highest in leaves and stems during the milk stage.—A. T. Wiancko.

PHOTOSYNTHESIS

614. COUPIN, HENRI. **Sur les plantules qui verdissent à l'obscurité.** [On seedlings which turn green in the dark.] Compt. Rend. Acad. Sci. Paris 170: 1071-1072. 1920.—A comparison of seedlings of pines grown in the light with those grown in darkness reveals a difference in the amount of chlorophyll and anthocyan in the cotyledons and hypocotyl. Very little morphological aetiolation occurs in this species. Only one kind of chlorophyll develops in darkness.—C. H. Farr.

615. KÖGEL, P. R. Über die Photosynthese des Formaldehyds und des Zuckers. [On the photosynthesis of formaldehyde and sugar.] *Biochem. Zeitschr.* 95: 313-316. 1919.—A brief theoretical discussion. The author considers the possibilities of the action of light in effecting enol-keto transformations analogous to the formation of benzil-benzoin from benzil and H_2 in presence of light; the light performs the double function of benzoin formation and of effecting benzil-benzoin combination. Benzil reacting with H_2 results in stilbendiol, which by rearrangement gives benzoin. The latter is an enol-keto transformation. These reactions suggest to the author a theory of photosynthesis. Two molecules of CO_2 arranged as a simple polymer unite with 2 molecules H_2O to give tetrahydroxyethylene and O_2 . The former is an enol form, which by transformation to the keto form may result in 2 molecules of $HCOH$ and O_2 .—*W. W. Bonns.*

METABOLISM (GENERAL)

616. ANONYMOUS. [Rev. of: ARMSTRONG, E. F. *The simple carbohydrates and glucosides.* 3rd ed., $x + 239$ p. Longmans, Green & Co.: London, 1919.] *Sci. Prog.* [London] 14: 688-689. 1920.

617. ANONYMOUS. [Rev. of: FISHER, MARTIN H., AND MARION O. HOOKER. *Fats and fatty degeneration: A physico-chemical study of emulsions and the normal and abnormal distribution of fat in protoplasm.* $ix + 155$ p. John Wiley & Sons: New York, 1917.] *Sci. Prog.* [London] 14: 502. 1920.

618. ANONYMOUS. [Rev. of: SPOEHR, H. A. *The carbohydrate economy of cacti.* Carnegie Inst. Washington [D. C.] Publ. 287. 79 p., fig. 1-2. 1919.] *Sci. Prog.* [London] 14: 511-512. 1920.

619. BLAKE, J. C. The individuality of erythroextrin. *Jour. Amer. Chem. Soc.* 42: 2673-2678. 1920.

620. BOAS, F., UND H. LEBERLE. Untersuchungen über Säurebildung bei Pilsen und Hefen. III. [Studies of acid formation by fungi and yeasts.] *Biochem. Zeitschr.* 95: 170-178. 1919.—The authors have studied the selective action of *Aspergillus niger* when grown in solution combinations of dextrose-acetamid, dextrose-acetamid-ammonium sulphate, dextrose-ammonium sulphate, dextrose-glycocol, dextrose-glycocol-acetamid, dextrose-peptone, dextrose-peptone-ammonium sulphate, and dextrose-ammonium sulphate. The data submitted are P_H variations in the substrate, growth (weight of mat and conidia formation), and reaction to Nessler's reagent. The strength of solutions ranged from 0.5-0.25 per cent. In the series with dextrose, acetamid, and ammonium sulphate the P_H values obtained during a 7-day experiment indicate that acetamid in presence of ammonium sulphate is not autolyzed. Similar results were obtained in the dextrose-glycocol-acetamid series, and in the series where peptone, dextrose, and ammonium sulphate were used in different combinations. The several experiments indicate a consistent election of nitrogen from ammonium salts as against the organic solutions used. The increased P_H values resulting are held to account for the partial inhibition of conidial formation and the presence of soluble starch in the solutions. On the basis of the results the authors conclude that lipid solubility (possessed by acetamid) is not a factor in the metabolism of the fungus, and that strongly dissociated nitrogen compounds are elected in preference to those weakly dissociated.—*W. W. Bonns.*

621. BOKORNY, T. Weitere Beiträge zur organischen Ernährung der grünen Pflanzen mit Ausblicken auf die Praxis. [Further consideration of organic nutrition of green plants with reference to practical usage.] *Biochem. Zeitschr.* 94: 78-83. 1919.—Potted plants, cabbage among others, treated for several weeks with solutions of glycerin, methyl alcohol, etc., showed favorable results. Cabbage treated with the alcohol resulted in growth indicated by 164 g. (40 g. dry weight) as against 74 g. (18 g. dry weight) control. Alcohol-treated rye developed

spikes in over 3½ months, and set fruit. The total weight obtained was 24 g. as against 11.2 g. for controls. Beans treated with 2 per cent methyl alcohol far surpassed controls in growth in 14 days. Cucurbit and carrot seedlings placed directly in alcohol solutions were injured. Cabbage treated with 0.25 per cent glycerin solution attained in 3 months a weight of 138.1 g. as compared with 74.4 g. for the control. The foregoing suggests as fertilizer the wastes from cellulose industries in which the sulphite process is employed, such waste containing a varying amount of sugar in addition to other organic constituents. Experiments with such material as fertilizer were conducted on plants in pots and in other containers. The addition of sulphite wastes are stated to have increased growth. Brief consideration is given to the possible fertilizing values of urine, urea, and urea compounds, with citations from other workers.—W. W. Bonns.

622. BOURQUELOT, EM. *Remarques sur la méthode biochimique de recherche des glucosides hydrolysables par l'émulsine à propos de la note de M. P. Delauney.* [The biochemical methods for research on the glucosides hydrolysable by emulsin.] *Compt. Rend. Acad. Sci. Paris* 171: 423-425. 1920.—Fourteen new glucosides of this type have been found in addition to the 8 known before 1902. Some of these have now been found in other plants. Out of 281 species examined 205 contained glucosides of this type.—C. H. Farr.

623. BOURQUELOT, EM., ET M. BRIDEL. *Recherche et caractérisation du glucose dans les végétaux par un procédé biochimique nouveau.* [Detection and identification of glucose in plants by a new biochemical process.] *Jour. Pharm. et Chimie* 22: 209-215. 1920.—The usual tests applied for detecting glucose in plants, that is, reduction of Fehling's solution, fermentation produced by means of yeast, or conversion into the osazone by means of phenylhydrazine, are not specific for this sugar, because other sugars, such as the aldohexoses, the aldopentoses, maltose, gentiobiose, cellobiose, and even glucosides, such as verbenalin, have reducing properties. Levulose, mannose, galactose, maltose, and saccharose can be fermented by beer yeast, levulose and mannose give the same osazone. When to an aqueous solution of a glucoside emulsin is added, the former is hydrolyzed, glucose is formed, and the solution becomes dextrorotatory. This reaction is reversible when carried out in an alcoholic medium, the glucose forming, for instance when methyl alcohol is used, a glucoside in the presence of emulsin, methyl glucoside, which is levorotatory. By applying this method, the authors succeeded in identifying glucose in juniper, *Loroglossum*, etc., which contain quite a number of other sugars in addition to glucose. For the details of the method the original should be consulted.—H. Engelhardt.

624. BOURQUELOT, EM., ET H. HÉRISSEY. *Essai de synthèse biochimique d'un mannobiose.* [Attempt to synthesize a mannobiose.] *Jour. Pharm. et Chimie* 21: 81-85. 1920.—The albuminoids of St. John's bread consist of mannan and galactan and are hydrolyzed by a ferment seminaise. This ferment, which is also present in *Trigonella foenum graecum*, *Medicago sativa* and *Sarothamnus scoparius*, has been utilized to synthesize mannobiose. For this purpose a maceration of lucerne seeds was allowed to act on an aqueous solution of mannose in the presence of a small amount of toluene. The results were not quite conclusive, a new substance probably consisting of 2 molecules of mannobiose, which, however, could not be obtained in a pure state, appears to be formed.—H. Engelhardt.

625. BOURQUELOT, EM., ET H. HÉRISSEY. *Presence dans le Mélilot et l'Aspérule odorante de glucosides fournissant de la coumarine sous l'action hydrolysante de l'émulsine.* [The presence of glucosides in Melilotus and Asperula odorata furnishing coumarin by the hydrolyzing action of emulsin.] *Jour. Pharm. et Chimie* 22: 289-298. 1920.—*Melilotus* and wood-root contain a glucoside which is split up by emulsin into coumarin and *d*-glucose, but the investigations do not throw any light on the constitution of the glucoside, which may contain other constituents besides these 2. The emulsin is present in the plant itself and can be obtained in powdered form. It readily hydrolyzes amygdalin and salicin.—H. Engelhardt.

626. BRIDEL, M. Sur la présence simultanée du gentianose et du saccharose dans les espèces du genre *Gentiana*. [The presence of both gentianose and saccharose in gentian.] Jour. Pharm. et Chimie 21: 306-311. 1920.—The simultaneous presence of both gentianose and saccharose in *Gentiana lutea*, *G. asclepiades*, *G. punctata*, *G. cruciata*, and *G. purpurea* can be explained by the gentiobiase (the ferment in gentian) acting both hydrolytically and synthetically, forming from the gentiobiose first saccharose and then, during the subsequent development of the root, transforming this again into gentiobiose.—H. Engelhardt.

627. LAST, E. Über die quantitative Bestimmung von geringen Zuckermengen bei Gegenwart von höheren und niederen Eiweissabbauprodukten. [The quantitative determination of small amounts of sugar in the presence of complex and of simple decomposition products of proteins.] Biochem. Zeitschr. 93: 66-81. 1919.—The BERTRAND titration method was used and the following abstract of his conclusions exhibits his results as to the limitations of the method. Precipitation of protein decomposition products affecting quantitative sugar determination is effected by using 2 g. neutral HgCl_2 per g. of protein (albumose, peptone) present. Acid and excess of HgCl_2 are to be avoided. Precipitation with $\text{Hg}(\text{NO}_3)_2$ according to the PATEIN-DUFAU method is satisfactory when accurately done.—If ereptone is present, there is a factor of error ascribed to the atomic grouping in the molecule. This is due to solution of cuprous oxide by the ammonia set free, and occurs either with boiling in alkaline solution or on long standing. Neutral HgCl_2 also precipitates ereptone in the test solutions to a degree sufficiently complete to give accurate sugar values. Here also precipitation with $\text{Hg}(\text{NO}_3)_2$ is satisfactory.—W. W. Bonns.

628. LUMIÈRE, AUGUSTE. Les vitamines sont-elles nécessaires au développement des végétaux? [Are vitamines necessary to the development of plants?] Compt. Rend. Acad. Sci. Paris 171: 271-273. 1920.—Fungi were cultivated on purely mineral and organic nutrients without the addition of vitamines and developed equally as well as in the presence of vitamines. Experiments are referred to which attempt to determine the properties of vitamines, such as precipitation, filtration, etc.—C. H. Farr.

629. RICHTER-QUITTNER, M. Eine Mikromethode der Acetonbestimmung. [A micro-method of acetone determination.] Biochem. Zeitschr. 93: 163-171. Fig. 1-2. 1919.

630. SHERRARD, L. C., AND G. W. BLANCO. The acid hydrolysis of sugar cane fiber and cotton seed hulls. Jour. Indust. Eng. Chem. 12: 1160-1162. 1920.—Of the total sugars produced by the acid hydrolysis of these materials, only a small quantity is fermentable, the larger portion being of the pentose variety.—Henry Schmitz.

631. TUNMANN, O. Über die Alkaloide bei Verwundungen der Pflanzen. [Alkaloids in relation to wounding of plants.] Biochem. Zeitschr. 95: 164-169. 1919.—The author has checked the work of TROEGELE, using *Atropa Belladonna* and *Pilocarpus pinnatifolius*. His conclusions, based upon quantitative and microchemical data obtained from these plants when subjected to traumatism and to snail depredations, are that such injuries do not result in increased alkaloidal content.—W. W. Bonns.

632. WISELL, VON. Ueber die chemische Bestimmung der Stärke in verschiedenen Reisigarten und einigen anderen Pflanzenstoffen. [The chemical determination of starch in various kinds of prunings and other plant materials.] Landw. Jahrb. 53: 618-625. 1919.—The author describes in detail 2 methods for determining chemically the quantity of starch in plant materials and concludes that the method of EWERS, involving extraction with hot weak hydrochloric acid without pressure, gives more dependable results than that of REINKE involving the use of high pressures.—A. J. Pieters.

633. ZIJP, C. VAN. Over de mogelijkheid van het ontstaan van Hexamethyleentetramine in assimilerende planten end eene microchemische reactie op ammoniumzouten. [The possibility of the production of hexamethylenetetramine in assimilating plants and a microchemical

reaction of ammonium salts.] Pharm. Weekblad 57: 1345-1348. 1 fig. 1920.—The author believes that contrary to the statement of O. LOEW "that in the presence of formaldehyde and of an ammonium salt no hexamethylenetetramine is formed in the living protoplasm" this product is formed, because he found by microchemical experiments that not only ammonia but also ammonium salts form hexamethylenetetramine. The test was made with iodine-potassium iodide solution by which characteristic microscopic crystals are produced.—*H. Engelhardt.*

METABOLISM (NITROGEN RELATIONS)

634. AUBEL, E. Influence de la nature de l'aliment carboné sur l'utilisation de l'azote par le *Bacillus subtilis*. [The influence of the carbon nutrients on the utilization of nitrogen by *Bacillus subtilis*.] Compt. Rend. Acad. Sci. Paris 171: 478-480. 1920.—More nitrogen is absorbed when this organism is grown on glycerine than when on glucose or levulose.—*C. H. Farr.*

635. BOS, E. C. VAN DEN. Action stimulante des sels azotés sur la germination de l'*Amarantus caudatus*. [Stimulation of germination in *Amarantus caudatus* by nitrogen-containing salts.] Recueil Trav. Bot. Neerland. 17: 69-120. 1920.—At a temperature of 15-16°C. the seeds germinate only in darkness. When the maximum temperature is almost reached, they germinate at 43-45°C. in the light only, though the seedlings never attain their full development.—In a Knop solution the germination was found to be more rapid, which suggested the action of nitrogen. A solution of 0.1 m. KNO_3 had an unfavorable influence, while 0.001 m. KNO_3 was more favorable. In some salts NO_3 proved to be stimulating whereas Cl and SO_4 -ions were not.—Solutions of KSCN of 0.4 m. gave a maximum germination of 80 per cent. Such compounds as asparagin and urea did not stimulate germination.—*J. C. Th. Uphof.*

636. LEWIS, W. C. McC. [Rev. of: ROBERTSON, T. BRAILSFORD. The physical chemistry of the proteins. xv + 483 p. Longmans, Green & Co.: New York, 1918.] Sci. Prog. [London] 14: 502-503. 1920.

637. LÜERS, H. Über die Identität von Hordein und Bynin. [The identity of hordein and bynin.] Biochem. Zeitschr. 96: 117-132. 1919.—Hordein of barley and bynin of malt were hydrolyzed according to the methods of VAN SLYKE to determine the relationships of these products. The author's analyses lead him to conclude that bynin is not a new protein differing from hordein in its properties, as OSBORNE believes, but that it is more likely a residuum.—*W. W. Bonns.*

638. PHEILER, W., UND F. ENGELHARDT. Ueber den Nachweis von Rizin in Füttermitteln mit Hilfe der serologischen (Präzipitations—Komplementablenkings und Konglutinations) Methoden sowie der Hämagglutination. [The identification of ricin in feedstuffs by means of serological methods, as well as the haemagglutination method.] Landw. Jahrb. 35: 561-583. 1919.—The author has investigated especially the method recommended by MIESSNER and REWALD and condemned as not specific by BIERBAUM. The author finds that the method is highly specific, when a proper antiserum is used. Investigations on the other methods are reported but the author concludes that properly used the precipitation method is specific and convenient.—*A. J. Pieters.*

639. ROUSSEAU, EUG., ET SIROT. Les matières azotées et l'acide phosphorique dans la maturation et la germination du blé. [The nitrogen compounds and phosphoric acid during the ripening and germination of wheat.] Compt. Rend. Acad. Sci. Paris 171: 578-580. 1920.—During the ripening of wheat the proportion of nitrogen to phosphoric acid, P_2O_5 , remains about constant. Both decrease until early July, whereafter they increase to some extent. Acidity is found to maintain a considerable decrease until the last of July.—*C. H. Farr.*

640. SERTZ, H. Über die Veränderung der Stickstoffformen in keimender Lupine, insbesondere über das Verhältnis von formoltitrierbarem und Formalinstickstoff zum Gesamtstick-

stoff. [The nitrogen changes in germinating lupines with special reference to the relation of formol-titratable and of formalin nitrogen to total nitrogen content.] *Biochem. Zeitschr.* 93: 253-254. 1919.—A brief note on the SØRENSEN formol titration method, showing that in the presence of neutral aqueous formaldehyde solution, plant albumins, albuminates, and hemialbumoses are practically insoluble, while formalin nitrogen, peptone, diastase, etc., remain soluble. Progressive germination gave increased values of formol-titratable nitrogen (soluble amino acids), and a corresponding falling off in formalin nitrogen (insoluble protein). The sum of the values obtained approximates the total nitrogen content.—W. W. Bonns.

METABOLISM (ENZYMES, FERMENTATION)

641. BOKORNY, T. *Bindung des Formaldehyds durch Enzyme.* [Formaldehyde fixation by enzymes.] *Biochem. Zeitschr.* 94: 69-77. 1919.—Reviewing briefly some results of NEUBERG showing variation in inhibitory effects of different concentrations of formaldehyde on various enzymes, and in the effects of the same concentration on different enzymes, Bokorny accounts for these on the theory of differences in molecular structure of enzymes, with corresponding difference in chemical reactions with formaldehyde. Quantitative data are presented showing the effect of formaldehyde on emulsin, based upon the formation of hexamethylenetetramine when formaldehyde reacts with ammonia, $6\text{HCOH} + 4\text{NH}_3 = 6\text{H}_2\text{O} + \text{C}_6\text{H}_{12}\text{N}_4$. Any excess ammonia is titrated against sulphuric acid. Treating 1 g. emulsin with 50 cc. 0.925 per cent formaldehyde for 3 days showed a formaldehyde combination of 11-38 per cent of the dry weight of the enzyme. The results cited are followed by the author's views on the protein nature of the enzyme, as indicated by its amphoteric properties, combination with acids, bases, etc.—W. W. Bonns.

642. BOURQUELOT, EM., M. BRIDEL, ET A. AUBRY. *Synthèse biochimique du cellobiose à l'aide de l'émulsine.* [Biochemical synthesis of cellobiose by means of emulsin.] *Jour. Pharm. et Chimie* 21: 129-132. 1920.—Cellobiose or cellose is a glucobiose and is isomeric with gentiobiose and maltose. The authors succeeded in synthesizing this sugar by allowing emulsin to act on a 50 per cent aqueous solution of glucose. The formation is probably due to the fact that emulsin does not appear to be a uniform ferment but to be composed of gentiobiase, cellobiase, and beta-glucosidase.—H. Engelhardt.

643. BRIDEL, M. *Sur la résistance des ferments de l'émulsine à l'action prolongée de l'alcoide méthylique à 70 p. 100.* [The resistance of emulsin toward the prolonged action of 70 per cent methyl alcohol.] *Jour. Pharm. et Chimie* 22: 323-327. 1920.—Seventy per cent methyl alcohol did not destroy the fermentative power of emulsin on beta-glucosides, lactose, and beta-ethyl-galactoside within 5 years. The strength, however, had been considerably reduced. The ferments acting on lactose and beta-ethyl-galactoside appear to be more resistant than beta-glucosidase.—H. Engelhardt.

644. FALK, K. G. *The chemistry of enzyme actions.* Amer. Chem. Soc. Monogr. Ser. 136 p. Chemical Catalog Co.: New York, 1921.—This constitutes the first of a series of monographs proposed by the American Chemical Society. These monographs are designed to serve two purposes, (1) to present in readable form for those who may not be specialists in the particular field the knowledge available on the selected topic, and (2) through a well digested survey of the present status of the problem to promote and facilitate research. The author is convinced that enzyme studies make contributions not merely to the "chemical phenomena underlying living matter" but also to "a better understanding of the fundamental chemical relations underlying an exact knowledge of chemical reactions."—He recognizes 2 methods of attack, briefly, (1) enzymes as catalysts, modifying reaction velocities (the kinetics of enzyme action), and (2) the chemical nature of enzymes and their reactions. He purposes to indicate the progress attained by these 2 methods, and proceeds to develop the subject under the following captions: Velocities of chemical reactions; general theory of chemical reactions, catalysis; chemical reactions catalyzed by enzymes; physical properties common to enzyme preparations; chemical properties common to enzyme preparations; chemical

nature of certain enzymes; mechanism of enzyme actions; uses and applications of enzymes; and the present status of the enzyme problem.—It is recognized by the author that the subject matter may not be presented in a completely rounded and final form; but it is intended to be adequately comprehensive, and to a large degree supplementary to existing works, emphasizing particularly in how far enzyme reactions may be, or have been shown to be, analogous to other chemical changes. The literature of recent work is freely cited.—*B. M. Duggar.*

645. JACOBY, M. *Über Bakterien-Katalase. III.* [Bacterialcatalase. III.] *Biochem. Zeitschr.* 95: 124-130. 1919.

646. KOCH, A., UND A. OELSNER. *Über die Betainspaltung durch die Bakterien des Melasseschlempedüngers "Guanol."* [The bacterial splitting of betain in the molasses-waste fertilizer Guanol.] *Biochem. Zeitschr.* 94: 139-162. 1919.—The authors have studied the organisms concerned with the splitting of betain in a commercial "Guanol" fertilizer produced from molasses waste. These comprised various forms to be found in compost,—mold organisms forming trimethylamine and a bacterium which the authors designate as *Betainobacter* α . The latter was studied in some detail and was found to split off all the nitrogen of the betain molecule as NH_3 , using for itself only a small portion. Methyl alcohol, formic acid, and acetic acid were noted as intermediate disintegration products.—*W. W. Bonns.*

647. NĚMEC, A. *Über die Verbreitung der Glycerophosphatase in den Samenorganismen.* [The distribution of glycerophosphatase in seeds.] *Biochem. Zeitschr.* 93: 95-100. 1919.—The author has determined the presence of the enzyme in the seeds of 20 species, using the method of NEUBERG and KARCZAG. The substrate used was a 1 per cent solution of sodium glycerophosphate (Merek), the total P_2O_5 being determined, and macerated seed material was allowed to act upon the phosphate solution under controlled conditions. Results are given in P_2O_5 split off. The necessary controls were determined. The values given in the author's table show that of the seeds used the cereals possess the least hydrolytic activity. Legumes show high enzyme content, differing considerably with the species. Plants of *Lens* and *Pisum* were more active than those of *Lupinus* and *Vicia*. The crucifers (*Brassica*, *Raphanus*, and *Sinapsis*) are especially rich in the enzyme, the latter splitting off more than 41 per cent P_2O_5 . The maximum activity was observed in the soy bean, which hydrolyzed almost 50 per cent of the glycerophosphate supplied. In general, seeds rich in oil are higher in enzyme activity of the kind here studied than the albuminous seeds, and the latter in turn have greater hydrolytic power than starchy seeds.—The fact that the P_2O_5 set free in no case exceeded 50 per cent of the amount present in the substrate leads the author to the belief that the enzyme present acts only on the naturally occurring *d*-glycerophosphoric acid. Thermolability of the enzyme at 100°C . was established.—*W. W. Bonns.*

648. NORTHROP, JOHN H. *The influence of hydrogen ion concentration on the inactivation of pepsin solutions.* *Jour. Gen. Physiol.* 2: 465-470. 1920.—Pepsin in solution at 38°C . was found to be most stable at a hydrogen-ion concentration of P_H 5.0. An increase above this point resulted in a slow increase in the rate of destruction of the pepsin, while a decrease resulted in a rapid increase in the rate of destruction. Neither the impurity of the enzyme, nor the anion of the acid affected appreciably the rate of destruction. There seemed to be no relation between optimum range of hydrogen-ion concentration for digestion and the destruction of the enzyme.—*Otis F. Curtis.*

649. NORTHROP, JOHN H. *The effect of the concentration of enzyme on the rate of digestion of proteins by pepsin.* *Jour. Gen. Physiol.* 2: 471-498. 1920.—The rate of protein digestion is not always proportional to the total concentration of pepsin. It is suggested that this may be due to inactivation of some of the enzyme by combination with some product of the reaction, perhaps peptone, and that this inactivation is quantitatively expressed by the law of mass action. The rate of reaction is, therefore, proportional to the quantity of active

enzyme, not total enzyme. The hypothesis has been put in the form of a differential equation and found to agree quantitatively with the experimental results when the concentration of pepsin, peptone, or both is varied. An integral equation is obtained which holds for the entire course of digestion with varying enzyme concentration. Many analogies between the action of pepsin on albumen and the action of toxins on organisms are pointed out.—*Otis F. Curtis.*

650. STAEHELIN, M. *Die Rolle der Oxalsäure in der Pflanze. Enzymatischer Abbau des Oxalations.* [The rôle of oxalic acid in plants. The splitting off of the oxalate ion by enzyme action.] *Biochem. Zeitschr.* 96: 1-49. 1919.—This is a detailed study of the enzyme in various plants capable of hydrolyzing oxalic compounds. A brief review of previous work dealing with acid metabolism of succulents is presented. The author sets out to determine the following points: (1) The distribution of the enzyme in different types of plants, that is, in nonsucculents and succulents of widely differing genera, (2) determination of an oxalate enzyme in acid-free plants, (3) distribution of the enzyme in the plant tissues, and (4) the kinetics of the reaction.—The objects studied covered chlorophyllous cryptogams and phanerogams, both in green and etiolated stages. In general the experimental methods comprised the incubation of the enzyme-containing plant powder with a solution of an oxalic acid salt, preferably ammonium oxalate. At the close of the experiment the residual oxalate was quantitatively determined. CO_2 determinations were made with standard Pettenkoffer and titration methods.—The chief results are as follows: Green leaves, stems, roots, etiolated organs, and chlorophyll-free seeds of all plants studied contained an oxalate-hydrolyzing enzyme. The pressed out juice as well as the powder precipitated by alcohol, possessed enzyme activity (*Helianthus* leaves). This action is greatest between 30 and 40°C., and is in large measure dependent upon oxygen supply. It is completely inhibited in an atmosphere of hydrogen. Increased oxalate concentration is correlated with a relative decrease in hydrolysis, hydrolysis increasing with the square root of the enzyme increase (rule of SCHÜTZ). With a preparation of *Rumex* leaves, enzyme action conforms to a mono-molecular equation, while with a powder from *Helianthus* leaves there is a deviation from the law of auto-catalysis. The enzyme is an oxidase, and appears to have the properties of a carboxylase. The oxalate ion is not completely oxidized by the enzyme to CO_2 (doubtful in case of *Pisum*). Other disintegration products were not determined.—*W. W. Bonns.*

651. WOHLGEMUTH, J. *Über neue Theorien der Diastasebildung und Diastasewirkung.* [On new theories of diastase formation and action.] *Biochem. Zeitschr.* 95: 212-224. 1919.—A discussion of the work of G. WOCHER, supplemented by a brief account of experiments, opposing the conclusions of Wocher that formaldehyde exerts an enzyme-like action on starch, similar to diastase action.—*W. W. Bonns.*

METABOLISM (RESPIRATION)

652. CERIGHELLI, RAOUL. *Sur les échanges gazeux de la racine avec l'atmosphère.* [The gaseous exchange between roots and atmosphere.] *Compt. Rend. Acad. Sci. Paris* 171: 575-578. 1920.—A study of attached and detached roots in which the oxygen intact and the carbon dioxide liberation was determined. The $\frac{\text{CO}_2}{\text{O}_2}$ ratio has a value varying from 0.7 to 1.0 according to the species. Respiration is higher in free humid air than in confined or dry atmosphere. In the case of a confined atmosphere such as occurs normally in the soil the CO_2 is retained in the tissues. In dry open air the ratio however is the same as in free humid air although the amount of gases exchanged is decreased.—*C. H. Farr.*

653. LANGDON, S. C., AND W. R. GAILEY. *Carbon monoxide a respiration product.* *Sci. Amer. Monthly* 1: 508-510. 3 fig. 1920. [Reprinted from *Jour. Amer. Chem. Soc.*, 42: 641-646. 1920.]—The existence of several per cent of carbon monoxide gas in the pneumatocyst (i.e., floater) of the giant Pacific Coast kelp, *Nereocystis luetkeana*, is confirmed. It is concluded that this is formed as a product of respiration rather than as an intermediate step in photosynthesis.—*Chas. H. Otis.*

654. HERZFELD, E., UND R. KLINGER. *Chemische Studien zur Physiologie und Pathologie VI. Zur Biochemie der Oxydationen. (Zellatmung; Oxydations-fermente; zur Theorie der Narkose.)* [Chemical studies in physiology and pathology VI. The biochemistry of oxidation. (Respiration; oxidases; narcosis).] *Biochem. Zeitschr.* 93: 324-352. 1919.—This is a critical discussion based upon the work of others. The author stresses the possibility that certain molecular structures may weaken the union of the O atoms in the oxygen molecule so that "activation" (increased oxidizing power) results, whereby loose chemical combinations are made with H₂O or with metals with peroxide-like structure, with OH ions, and with O₂-adsorbing surfaces. Such organic compounds as the lower fatty acids or their salts might be oxidized to CO₂ and H₂O, fulfilling the conditions for oxidation processes in the living organism, namely, active O₂ and easily oxidizable simpler metabolic products, rendering the assumption of certain oxidases unnecessary.—It is stated that 'Narcosis depends upon the disturbance of the formation or the adjustment of differences in physiological potential upon which the activity of the nervous system rests. Widely different compounds can effect this, depending upon a loose combination (adsorption) with the nerve substance. Certain narcotics (CO₂, N₂O) act by means of acid accumulation in the tissues. This may be the mode of action of the lipoid-soluble narcotics, correlated with an inhibition of oxidative processes. Neither for the latter group nor for narcotics in general is the inhibition of oxidation the sole or the most probable controlling factor of action.'—W. W. Bonns.

ORGANISM AS A WHOLE

655. REED, H. S. *Conditions affecting the potentiality of the seed.* [Rev. of: KIDD, F., and C. WEST. *Physiological predetermination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield.* *Ann. Appl. Biol.* 5: 1-10, 112-142, 157-170, 220-251. 1918-1919; 6: 1-26. 1919.] *Plant World* 22: 363-364. 1919.—Various questions indicated by the title are "discussed in a spirit which cannot fail to be stimulating to all further work in this important field."—C. H. Shull.

656. STILES, W. *Plant physiology.* *Sci. Prog.* [London] 14: 392-396. 1920.—A brief review of some of the more recent papers dealing with the effect of light, temperature, and humidity on the development of plants.—J. L. Weimer.

GROWTH, DEVELOPMENT, REPRODUCTION

657. CHURCH, MARGARET B. *Root contraction.* *Plant World* 22: 337-340. 1 fig. 1919.—A general review of literature on root contraction is given, and the facts summarized as follows: Roots do shorten; the parenchyma tissue of the root is the active tissue; cork and vascular traces are passive; the cork is crushed by contraction ultimately; there is a region where wrinkling and shortening both occur, another where shortening but no wrinkling is visible, and an unchanged region; dicotyledons show distorted bundle traces, while monocotyledons have bundles that remain straight during contraction. The author suggests the desirability of study of serial sections coupled with consideration of turgor changes and biochemical alteration of the protoplast and cell walls.—Charles A. Shull.

658. JONES, W. NEILSON. *A simple root auxanometer.* *Ann. Bot.* 34: 555-557. 1 fig. 1920.—The apparatus consists of a cylindrical glass jar provided with a stopper in which slides a glass rod. The root of a seedling impaled on a pin also sliding through the stopper, is adjusted to touch exactly the surface of water partly filling the jar, and the height of the rod, which dips into the water, is noted. After an interval the water is lowered and the tip readjusted by withdrawal of the rod, the amount of which withdrawal divided by the ratio of the cross section of jar to rod gives the growth in that interval. The exactness with which the contact of a tip with a water surface can be seen, and the great difference possible in the cross sections of rod and jar, render the apparatus very sensitive in principle. Suggestions are added for more exact calibration and compensation of evaporation.—W. F. Ganong.

659. KUIPER, K., JR. Koolsuurbemesting nachtverlichting en andere groeibevorderende factoren in de plantenteelt. [Effects of carbon dioxide manuring, night illumination, and other growth-stimulating factors upon plant culture.] *Cultura* 32: 332-344, 355-368. 1920.—A general review is given of experiments on the above subjects done by various investigators. The bibliography comprises 41 titles.—*J. C. Th. Uphof.*

660. REED, H. S. The nature of the growth rate. *Jour. Gen. Physiol.* 2: 545-561. 1920.—This paper is concerned with the application of the equation of an autocatalytic reaction to the growth of shoots of 3 year old pears (*Pyrus communis*), seedlings of *Juglans nigra*, and scions of *Juglans regia* grafted on *Juglans nigra*. The equation is applied also to data obtained by KREUSLER on growth of maize as well as to data presented by ECKLES and SWERTT on the growth of Jersey heifers. The author finds a correspondence between the growth rate and rate of an autocatalytic reaction, and considers that the growth of an organism may be considered as a chemical reaction and that the growth rate for any moment is proportional to the growth yet to be made.—*L. Knudson.*

661. SAITO, KENDO. Über die chemischen Bedingungen der Askenbildung bei *Zygosaccharomyces major* Takahashi et Yukawa. [Chemical conditions for ascus formation in *Zygosaccharomyces major*.] *Bot. Mag. Tôkyô* 32: 1-13, 15-25. 1918.—It has been previously shown that *Zygosaccharomyces* forms no spores when grown on the usual gypsum blocks; but it has also been determined that on "soja bean sauce" with NaCl content of 5 per cent, and suitable temperature, abundant asci with spores are produced in 5-12 days. The author now shows that well nourished cultures produce a fine yield of asci and spores in 2-4 days on gypsum blocks moistened with 0.5 dextrose and 4-10 per cent NaCl. Testing 73 substances, including primarily inorganic and organic salts, carbohydrates, and certain amino acids, it is found that many inorganic and some organic salts used in concentrations of 0.5-1.5 m., in conjunction with 0.5 per cent dextrose, produce the same action; but in general non-electrolytes are of no value, or of slight comparative value. Many neutral salts of metals were, of course, toxic, and alkaline and acid salts often so in consequence of the reactions.—The addition of relatively little acid or alkali to the NaCl-dextrose cultures causes inhibition of the process, likewise all ammonium salts are inhibitory. Combinations of nutrient salts are entirely favorable. In part at least the morphogenic stimulus in ascus formation is the nutrient relation of the surrounding medium.—*B. M. Duggar.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

662. BOSE, J. C. Researches on growth of plants. I, II. *Nature* 105: 615-617, 648-651. *Fig. 1-6.* 1920.—The author discusses tropic movements in general, especially geotropism and heliotropism.—*O. A. Stevens.*

663. RICHOME, H. Action de la pesanteur sur les végétaux. [The effect of weight on plants.] *Compt. Rend. Acad. Sci. Paris* 171: 261-263. 1920.—It is suggested that negative geotropism may be due to the weight of the terminal portion of the plant causing a compression below which stimulates growth and a tension above which retards it. This condition is indicated by the longitudinal splitting of geotropically stimulated stems. It is thus concluded that the plant exhibits a perception of weight.—*C. H. Farr.*

664. SPRUIT, C. The influence of electrolytes on the tactical movements of *Chlamydomonas variabilis* Dangeard. *Recueil Trav. Bot. Néerland.* 17: 129-204. *Fig. 1-7.* 1920.—Colloid chemical representations can be made of the influence of chemotactic agents. With *Chlamydomonas variabilis* there was observed a clear positive geotaxy, whereas other investigators have found *C. pulvisculus* to be negatively geotactic. Reaction to gravity ceases after adding to the water small quantities of acid, base, or salt. The susceptibility to light, like that to gravity, is diminished under the influence of added electrolytes. Besides a negative phototactic reaction a positive reaction may also occur. Thigmotactic response is manifest only in solutions which are not distinctly alkaline.—It was possible to produce an oxygen-line in the dark under a cover glass. By means of *Spirillum* sp. it was shown that under the

influence of carbonic acid a removal of the oxygen-line was effected. It was found possible to calculate the critical concentration where theoretically the transition of quick to slow movement took place. Motility was judged by means of the reaction to gravity.—On account of the great influence of H ions and OH ions the solutions were regularly changed. The solutions were used in a graded series, in each of which the H-ion concentration was constant. Salt solutions with gradations in H-ion concentrations were obtained by adding small quantities of acid or base. With acetate solutions, the fluids were made acid with acetic acid; in this case "buffer solutions" were obtained, which offered special advantages. The H ions and the OH ions have much influence on the movements of *Chlamydomonas*. Mixtures of sodium acetate with acetic acid and with potassium hydroxide in which the amount of acetate was constant were used. For KCl an important change of sensibility was observed, while with K_2SO_4 and KNO_3 the differences were insignificant.—The isoelectric point of the plasma colloids was calculated to be in weakly alkaline solutions. Two phenomena which might give further information about the place of the isoelectric point were the sticking of the organisms to the glass and also the sticking together of the algae by means of their cilia. The first phenomenon took place in solutions more acid than the isoelectric point of the plasma colloids, a fact attributed to the negative charge on the glass in alkaline, neutral, and very weakly acid solutions. Under the influence of light or of gravity the cilia of these algae came continually into contact with the glass, thus making it possible to acquire or lose an electrical charge. It was pointed out that the acid optimum of *Chlamydomonas* in chemotactic experiments is probably an acid optimum only under the influence of the glass.—*J. C. Th. Uphof.*

GERMINATION, RENEWAL OF ACTIVITY

665. COUPIN, HENRI. Sur la résistance de plantules à l'inanition. [On the resistance of seedlings to starvation.] *Compt. Rend. Acad. Sci. Paris* 171: 550–551. 1920.—Seedlings of 17 types of plants were left in the dark chamber after germination and the period elapsing before death occurred was noted. The species which lasted longest was the piñon pine, which did not die until after 60 days. The plants which succumbed first were those of alfalfa, which died in 15 days.—*C. H. Farr.*

666. NOBBE, F. Untersuchungen über den Quellprozess der Samen von *Trifolium pratense* und einiger anderer Schmetterlingsblütler. [Investigations regarding the swelling process in the germination of seeds of *Trifolium pratense* and other papilionaceous plants.] *Landw. Versuchssta.* 94: 197–218. 1919.—The capacity of clover seed to swell and germinate, over a period of forty years, is shown. Data are presented showing the effect of the climate under which the seeds are produced, the color, and size on the swelling capacity. The germination of the seeds of some wild papilionaceous plants can be largely increased by vigorous rubbing with sand. The action of alternate swelling and drying as well as the significance of the seed coat in germination is discussed.—*G. M. Armstrong.*

667. JÖRGENSEN, I., AND W. STILES. Some scientific aspects of cold storage. *Sci. Prog.* [London] 14: 427–434. 1920.—A consideration of the effect of slow and rapid freezing and thawing upon the water content of certain plant and animal tissues.—*J. L. Weimer.*

668. WEISS, H. The heat resistance of spores with special reference to the spores of *B. botulinus*. *Jour. Infect. Diseases* 28: 70–92. 1921.—The free spores of *B. botulinus* are destroyed within 5 hours at 100° , within 40 minutes at 105° , and within 6 minutes at $120^\circ C.$, the thermal death point being determined under optimum conditions for survival. The destruction of the spores is a gradual process, probably due to a gradual protein coagulation, the spores being injured before they are killed, as inferred from the fact that the longer the period of heating before the spores are killed, the longer the period required for those spores to germinate. Young moist spores have a higher thermal resistance than old moist spores. The hydrogen-ion and hydroxyl-ion concentrations as well as sodium chloride considerably lower the thermal resistance, the lowering increasing with the increase in concentration of the ions or of the salt.—*Selman A. Waksman.*

TOXIC AGENTS

669. BERCELLER, L. Über Adsorption und Adsorptionsverbindungen V. Die Adsorptionsverbindungen des Kupferhydroxyds. [Adsorption and adsorption compounds V. The adsorption compounds of copper hydroxide.] *Biochem. Zeitschr.* 93: 230-236. 1919.

670. GUÉRITHAULT, B. Sur la présence du cuivre dans les plantes et particulièrement dans les matières alimentaires d'origine végétale. [On the presence of copper in plants and especially in foods of vegetable origin.] *Compt. Rend. Acad. Sci. Paris* 171: 196-198. 1920. —A description of the methods used in the determination of the amount of copper in plant tissues. Analyses of 44 types of plants are given in which the amount of copper in the ash varied from 63.6 per cent in sweet almond to 8.7 per cent in radish.—C. H. Farr.

671. MAQUENNE, L., ET E. DEMOUSSY. Sur la toxicité du fer et les propriétés antitoxiques du cuivre vis-à-vis des sels ferreux. [On the toxicity of iron and the antitoxic properties of copper in the presence of ferrous salts.] *Compt. Rend. Acad. Sci. Paris* 171: 218-222. 1920. —Iron salts in culture solutions are often altered into salts which are precipitated and which in themselves are not toxic, but give rise to a toxic acid. Peas grown in a culture medium in which iron and CaSO_4 were present showed the maximum growth. Growth decreases as the iron content is increased. A considerable growth occurs if KH_2PO_4 and CaSO_4 are both present. Ferrous salts are found to be always injurious, whereas ferric salts stimulate growth if used in small amounts. Iron alum and ferric oxide retard growth in all parts of the plant except in the stem, which is slightly stimulated.—C. H. Farr.

672. TRAUBE, J., UND H. ROSENSTEIN. Über die Wirkung von oberflächenaktiven Stoffen auf Pflanzensamen. [The action on seeds of compounds affecting surface tension.] *Biochem. Zeitschr.* 95: 85-100. 1919.—Seeds of cereals after preliminary water imbibition were subjected to the various organic compounds known to modify surface tension. In the case of volatile agents the seeds were exposed to the vapors; otherwise they were placed in the liquid. The results were noted in terms of per cent of germination and amount of growth.—In general the work of earlier investigators is confirmed, that is, a variation from stimulation to inhibition is correlated with increase in time of exposure to the agent. Narcotics, such as chloroform, ethyl ether, urethane, etc., showed a range of action conforming, over a series, to their effect as animal narcotics. With respect to germination and growth processes the phenomena of reversibility and irreversibility of narcosis as well as of stimulation were established.—Similar data were obtained for a series of disinfectants, such as cresol and naphthalene. The higher fatty acids, caproic and caprylic, were strongly stimulative to germination when applied in small doses.—W. W. Bonns.

673. WIENTJES, K. Accélération de la germination sous l'influence des acides. [Influence of acids upon germination.] *Recueil Trav. Bot. Néerland.* 17: 33-68. 1920.—The influence of HCl , H_2SO_4 , oxalic acid, and tartaric acid upon the germination of seeds of *Phacelia tanacetifolia*, *Solanum Lycopersicum*, *Alisma Plantago*, *Epilobium hirsutum*, and *Lythrum Salicaria* was determined.—There was no influence on *Phacelia*, *Alisma*, *Epilobium*, and *Lythrum*, but with *Solanum* some acceleration of germination was observed.—J. C. Th. Uphof.

ELECTRICITY AND MECHANICAL AGENTS

674. ANONYMOUS. Difference of potential in biology. *Sci. Amer. Monthly* 2: 122. 1920. —An account of a report presented to the Société de Biologie, Paris, March 13, 1920. It concerns experiments on the electric phenomena associated with certain physiological processes of plants and animals.—Chas. H. Otis.

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistan' Editor*

(See also in this issue Entries 9, 13, 14, 20, 24, 25, 28, 34, 92, 93, 97, 108, 557, 604)

675. ANONYMOUS. **Fertilizers and parasiticides.** [Rev. of: COLLINS, S. H. *Chemical fertilizers and parasiticides.* xii + 273 p. Baillière, Tindall, and Cox: London, 1920.] *Nature* 106: 206-207. 1920.—Review refers to fertilizers only.—O. A. Stevens.

676. BEALS, COLONZO C. **Soil survey of Cass County, Indiana.** *Proc. Indiana Acad. Sci.* 1918: 186-204. 1920.—The upland soils are of the Clyde, Miami, and Dunkirk type. Muck also is present. The principal crops are corn, wheat, oats, clover, timothy, and potatoes. The paper is largely descriptive.—F. M. Schertz.

677. CARR, R. H., AND LEROY HOFFMAN. **The relation of nitrogen, phosphorus and organic matter to corn yield in Elkhart County, Indiana.** *Proc. Indiana Acad. Sci.* 1918: 160-165. *Soil map.* 1920.—About 50 per cent of the soils of this county are of the Miami loam and Miami sandy loam types and about 27 per cent are of the Plainfield sandy loam type. These soils are low in organic matter and 51 per cent are acid. Crop yield bears a close relation to the organic matter present and this in turn is closely associated with the amounts of nitrogen and phosphoric acid present. Three samples show that good crops are not always obtained from soil with the requisite plant food content. The difference in yield between the 0.2 per cent and the 8-10 per cent organic matter in soils averages 25.6 bushels. In average field conditions for each increase of 2672 lbs. of organic matter, 71.6 lbs. of nitrogen, and 35.7 lbs. of phosphoric acid per acre (2,000,000 lbs.) there is an increase of 1 bushel of corn.—F. M. Schertz.

678. CARR, R. H., AND V. R. PHARES. **Analyses of one hundred soils in Allen County, Indiana.** *Proc. Indiana Acad. Sci.* 1918: 151-159. *Soil map, pl. 1-3.* 1920.—The soils are of glacial origin, 70 per cent belonging to the Miami series and 18.5 per cent to the Clyde series. Determinations of the volatile organic matter, phosphoric acid, and nitrogen were made. In organic matter, 11 per cent of the soils had less than 4 per cent; 45 per cent of the soils ranged from 4 to 7 per cent; 37 per cent from 7 to 15 per cent; and 6 per cent were above 15 per cent. Each per cent increase in organic matter carried with it an increase of 519 lbs. of nitrogen and 72 lbs. of phosphoric acid per acre. Charts show that nitrogen has more influence on high corn yields than has phosphoric acid. Fifty-five per cent of the soils were acid to litmus, a condition causing "clover sickness."—F. M. Schertz.

679. HOFFMANN. **Düngungsversuche mit neuzeitlichen Stickstoffsalzen im Erntejahr 1920.** [Fertilizer experiments with new nitrogen salts in 1920.] *Mitteil. Deutsch. Landw. Ges.* 36: 26. 1921.—The author brings together in tabular form the records of cooperative fertilizer experiments with various salts of nitrogen.—A. J. Pieters.

680. NOYES, H. A., AND G. L. GROUNDS. **Number of colonies for a satisfactory soil plate.** *Proc. Indiana Acad. Sci.* 1918: 93-101. *Pl. 1-2, fig. 1-7.* 1920.—Tests have shown that 30 colonies of bacteria is the optimum number for a petri dish 100 mm. in diameter. Plates carrying between 10 and 100 colonies are satisfactory for computing bacterial counts.—F. M. Schertz.

681. NOYES, H. A., EDWIN VOIGT, AND J. D. LUCKETT. **The length of time to incubate petri plates.** *Proc. Indiana Acad. Sci.* 1918: 102-109. 1920.—Counts made after 10 days' incubation at 20°C. from bacterial dilutions of soil gave reliable results for the bacterial content of the soil, provided the number of bacteria present was small enough to allow all bacteria to develop into colonies. The rapidity with which bacteria develop into colonies varies with the soil and is influenced by soil temperature, moisture, and aeration.—F. M. Schertz.

682. TRUFFAUT, G., ET N. BEZSSONOFF. Étude comparée sur la microflore et la teneur en azote des terres partiellement stérilisées par le sulfur de calcium. [A comparative study of the microorganisms and the nitrogen content of soils partially sterilized by CaS.] Compt. Rend. Acad. Sci. Paris 171: 268-271. 1920.—Soils treated with CaS are found to contain much nitrogen and also *Clostridium pastorianum* and the principal ammonifiers of the soil. When CaS is used in amounts of 150 kg. per hectare in the field the soil is not found to be low in nitrogen.—C. H. Farr.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 146, 208, 229, 232, 377, 433)

GENERAL

683. ANONYMOUS. [Rev. of: HITCHCOCK, A. S., AND P. C. STANDLEY. *Flora of the District of Columbia*. Contrib. U. S. Nation. Herb. 21: 1-329. 42 pl. 1919.] Nature 105: 242. 1920.

684. ANONYMOUS. [Rev. of: SCHOOLBRED, W. A. *The flora of Chepstow*. x + 140 p. Taylor & Francis: London, 1920.] Jour. Botany 58: 178-180. 1920.

685. ANONYMOUS. [Rev. of: STONE, WILMER [WITMER]. *The use and abuse of the genus*. Science 51: 427-428. 1920.] Jour. Botany 58: 196-197. 1920.

686. BENNETT, ARTHUR. [Rev. of: LINDMAN, C. A. M. *Svensk Fanerogamflora*. viii + 639 p., 300 illus. P. A. Norstedt & Söners: Stockholm, 1918.] Jour. Botany 58: 153-156. 1920.—See Bot. Absts. 8, Entry 727.

687. BRITTON, NATHANIEL LORD. *Flora of Bermuda (Illustrated)*. 8 vo., 585 p., 1 pl. (colored), 519 fig. Charles Scribner's Sons: New York, 1918.—The present comprehensive work includes the four great phyla of the vegetable kingdom. The Spermatophyta and Pteridophyta have been elaborated by the author. The chapters on the lower groups have been contributed by specialists, as follows: Musci by ELIZABETH G. BRITTON, Hepaticae by ALEXANDER W. EVANS, Lichenes by LINCOLN W. RIDDLE, Fungi by FRED J. SEAVER, and the Algae by MARSHALL A. HOWE. In the case of the Spermatophyta, Pteridophyta, and Bryophyta keys are given which lead to the orders, families, and genera; and under the larger genera keys are also given to the species. Ample descriptions accompany each category, and a limited synonymy is cited. Text-figures well illustrate distinctive species of the more important genera. Neither keys nor illustrations are given for the Thallophyta. No new species, new combinations, nor new names of the higher plants are published in the present volume. The following species of algae are new to science: *Boddlea struveoides* Howe, *Dasya Collinsiana* Howe, *Callithamnion Herveyi* Howe, *Seirospora purpurea* Howe, *Ceramium leptozonum* Howe, and *Nemastoma gelatinosum* Howe. The author adds a chapter on "Bibliography," and one on the "Principal botanical collections made in Bermuda."—J. M. Greenman.

688. EWART, A. J. *Contributions to the flora of Australia*, No. 27. Proc. Roy. Soc. Victoria N.S., 31: 367-378. Pl. 18. 1919.—In connection with work on names of Victorian plants questions arose as to priority and especially as to whether the plants were really native. The decisions and references to the evidence are given for about fifty cases. OSTENFELD's revision of the annual species of *Triglochin* and a key based on his, but including the recognized Australian species, both annuals and perennials, is given.—Some measurements of girth growth in one tree of *Ulmus campestris* L. are appended. The girth did not increase

from July to October, it began to increase in November, was greatest from mid-December to the end of February, remained constant from January to March, decreased 0.2 to 0.3 inches during April, and again remained constant during May and June. Sections showed that cambial growth began a month before girth increase was measurable. Figures of the parasitic activities of *Cassytha melantha* are given.—*Eloise Gerry*.

689. G[ONZÁLEZ] F[RAGOSO], ROMUALDO. [REV. OF: BARNOLA, P. J. M. DE. *Flora vascular del Principado de Andorra*. [Vascular flora of the Principality of Andorra.] Soc. Iber. Cien. Nat. Mem. I. Zaragoza, 1919.] Bol. R. Soc. Española Hist. Nat. 19: 486. 1919.

690. NAKAI, TAKENOSHIN. *Notulae ad plantas Japoniae et Koreae*, XXII. [Notes on plants of Japan and Korea, 22.] Bot. Mag. Tôkyô 34: 35-54. 1920.—The following new species, varieties, and combinations are made: *Dryopteris dentipalca*, *Achyranthes japonica*, *A. molliscula*, *Aconitum mitakense*, *A. paniculigerum*, *A. volubile* vars. *napellifolium* (Seringe) Nakai and *flexuosum* (Reichenbach) Nakai, *Rosa hirtula* (Regel) Nakai, *Tilia Myabei* var. *yessoana*, *Stachys baicalensis* vars. *hispidula* (Ledebour) Nakai and *hispidula* (Regel) Nakai, *S. palustris* var. *Imaii*, *Teucrium brevispicum*, *Pedicularis lunaris*, *Lobelia sessilifolia* var. *latifolia*, *Achillea rhodoptarmica*, *Artemesia stolonifera* var. *laciniata*, and *Cirsium setidens* (Dunn) Nakai.—*Roxana Stinchfield Ferris*.

691. NELSON, J. C. *Under which code*. Amer. Bot. 26: 129-135. 1920.—A criticism of the American Code with arguments for the universal acceptance of the Vienna Code.—*S. P. Nichols*.

692. TURRILL, W. B. *Botanical exploration in Chile and Argentina*. Bull. Misc. Inf. Kew 1920: 57-66. 1920.—An extensive list of collectors and districts visited by them.—*E. B. Payson*.

693. WILEY, FLORENCE. *The vegetative organs of some perennial grasses*. Proc. Iowa Acad. Sci. 25: 341-367. Fig. 121-144. 1920.—Recognition characters of the rhizomes and young shoots of 26 species of perennial grasses and one undetermined *Carex*. Only external features are given, except in *Poa*.—*H. S. Conard*.

694. ZIMMERMANN, WALTHER. *Badische Volksnamen von Pflanzen III*. [Baden common plant-names.] Mitteil. Badisch. Landesver. Naturk. u. Naturschutz in Freiburg N.S., 1: 49-57, 65-77. 1919.—An extensive list of common names of various plants, chiefly vascular, with the localities in which they are used.—*E. B. Payson*.

PTERIDOPHYTES

695. FONT QUER, P. *Pteridofitas de las Pitiusas*. [Pteridophytes of the Pityuses.] Bol. R. Soc. Española Hist. Nat. 19: 507-511. 1919.—The Department of Botany of the Museum of Natural Sciences of Barcelona has undertaken the study of the flora of the Pityuse Isles, in the Mediterranean about sixty miles east of the mainland of Spain. Several collecting trips extending over parts of two years brought to light a number of pteridophytes not reported before from these islands. Thirteen species are enumerated by the author as having been collected during the trips from the Barcelona Museum, localities and other information being given for the various entries. Mention is made of other botanists who have collected in these islands and considerable discussion is devoted to some of the species found or reported by them. Altogether the pteridophytes now known to occur in the Pityuse Isles number twenty-nine.—*O. E. Jennings*.

696. G[ONZÁLEZ] FRAGOSO, R[OMUALDO]. [REV. OF: CADEVALL Y DIARS, D. J. *Monografía de las Criptogamas vasculares catalanas*. (Monograph of Catalanian vascular cryptogams.) Mem. R. Acad. Cien. y Artes [Barcelona] 15, No. 7. July, 1919.] Bol. R. Soc. Española Hist. Nat. 19: 485-486. 1919.

697. HIERONYMUS, G. *Kleine Mitteilungen über Pteridophyten I.* [Short communications on Pteridophytes I.] *Hedwigia* 59: 319-339. 1918.—Critical notes are given concerning a number of species of *Athyrium* and *Diplazium*. The following new names and combinations occur: *Athyrium mengtzeense*, *A. cognatum* (*Asplenium cognatum* Mett.), *Diplazium vera-pax* (*Asplenium vera-pax* Donn.-Sm.), *D. novoguineense* (*D. silvaticum* (Bory) Sw. var. *novoguineense* Rosenst.), *D. Guildingii* (*Asplenium Guildingii* Jenman), *D. unilobum* (*Asplenium unilobum* Poir.), *D. Kaulfussii*, *D. alienum* (*Asplenium alienum* Mett.), *D. Mearnsii*.—E. B. Payson.

698. HIERONYMUS, G. *Kleine Mitteilungen über Pteridophyten II.* [Short communications on Pteridophytes II.] *Hedwigia* 61: 1-39. 1920.—Extensive notes are given concerning the synonymy, identity, and important characteristics of a number of species of the genus *Asplenium*. The following new names and new combinations are made: *Asplenium squamuligerum* (*A. varians* J. Sm. var. *squamuligera* Rosenst.), *A. fluminense* (*A. lunulatum* var. *fluminense* Lindm.), *A. otites* Link var. *linearilanceolata*, *A. acrocarpum* (*Diplazium acrocarpum* Rosenst.).—E. B. Payson.

699. MERRILL, E. D. On the identity of *Polypodium spinulosum* Burm. f. *Proc. Linn. Soc. New South Wales* 44: 353-354. 1919.—The excellent figure used by BURMAN, "Flora Indica," 1768, as illustrating *Polypodium spinulosum* Burm. f. is questioned. Burman's description is cited as short and imperfect. The writer considers that the plant was not from Java, as stated, but unquestionably is the West Australian species, *Synaphea polymorpha* R. Br., one of the Proteaceae. The adjustment of the synonymy to the name *Synaphea spinulosa* (Burm. f.) is given. It is stated that the species is of wide distribution in West Australia and agrees in all respects with Burman's description and figure.—Eloise Gerry.

700. WATTS, W. W. *Aspidium goggilodus* Schkuhr. *Jour. Botany* 58: 153. 1920.—The author takes exception to the practise of spelling the above specific name, when transferred to *Nephrodium*, as *gongylodes*, and points out that the original spelling probably had a different etymology.—K. M. Wiegand.

SPERMATOPHYTES

701. AMES, O. *Orchidaceae. Illustrations and studies of the family Orchidaceae* 6: xiv + 335 p., pl. 80-101. 1920.—This contribution to our knowledge of Malayan and Philippine Orchidaceae consists of two separate papers. The first by OAKES AMES and CHARLES SCHWEINFURTH is entitled "The orchids of Mount Kinabalu, British North Borneo" and the second, by OAKES AMES is entitled "Notes on Philippine Orchids, VII." The paper on Mount Kinabalu orchids is based largely on the collections made by CHAPLAIN JOSEPH CLEMENS in 1915, 222 species being enumerated. Of these, 1 genus and the following species are described as new: *Habenaria crassinervia*, *Chlorosa Clemensii*, *Goodyera rostellata*, *Kuhlhaseltia kinabaluensis*, *Vrydagzynea grandis*, *Nephelaphyllum flabellatum*, *Coelogyne amplissima*, *C. Clemensii*, *C. Clemensii* var. *longiscapa*, *C. compressicaulis*, *C. genuiflexa*, *C. kinabaluensis*, *C. longibulbosa*, *C. plicatissima*, *C. radioferens*, *C. rigidiformis*, *Dendrochilum alatum*, *D. angustipetalum*, *D. crassifolium*, *D. exasperatum*, *D. fimbriatum*, *D. Haslamii*, *D. imbricatum*, *D. Jodemensii*, *D. kaborangense*, *D. lancilabium*, *D. lobongense*, *D. longirachis*, *D. perspicabile*, *D. quinquelobum*, *D. subintegrum*, *Pholidota Clemensii*, *P. kinabaluensis*, *P. pectinata*, *Nabalua* new genus, *N. Clemensii*, *Malaxis graciliscapa*, *M. multiflora*, *M. variabilis*, *Oberonia affinis*, *O. kinabaluensis*, *O. patentifolia*, *O. triangularis*, *Liparis grandis*, *L. kaborangensis*, *L. lingulata*, *L. pandurata*, *Arundina gracilis*, *Dendrobium bicarinatum*, *D. crumenatum* Sw. var. *parviflorum*, *D. fusco-pilosum*, *D. kiauense*, *D. longirepens*, *D. minimum*, *D. oblongum*, *D. patenilobum*, *D. singulare*, *D. tricallosum*, *D. tridentatum*, *Eria brevipedunculata*, *E. carnosissima*, *E. farinosa*, *E. latiuscula*, *E. macrophylla*, *E. magnicallosa*, *E. mollicaulis*, *Ceratostylis crassilingua*, *C. longisegmenta*, *Agrostophyllum globigerum*, *Chilopogon kinabaluensis*, *Appendicula divaricata*, *A. foliosa*, *A. linearifolia*, *A. longirostrata*, *A. magnibracteata*, *A.*

minutiflora, *Bromheadia divaricata*, *Phajus subtrilobus*, *Calanthe cuneata*, *C. tenuis*, *Bulbophyllum anguliferum*, *B. caudatisepalum*, *B. concavum*, *B. crassicaudatum*, *B. cuneifolium*, *B. deltoideum*, *B. disjunctum*, *B. eximium*, *B. lanceolatum*, *B. latisepalum*, *B. longimucronatum*, *B. magnivaginatam*, *B. minutiflorum*, *B. pergracile*, *B. reflexum*, *B. rhizomatosum*, *B. sigmoideum*, *B. venustum*, *B. vinaceum*, *B. vinculibulbum*, *Thelasis carnosus*, *T. variabilis*, *Eulophia ovalifolia*, *Grammatophyllum kinabaluense*, *Cymbidium angustifolium*, *Thrixspermum crescentiforme*, *T. triangulare*, *Trichoglottis magnicallosa*, *T. tenuis*, *Malleola kinabaluensis*, *M. transversisaccata*, *Sarcanthus Merrillianus*, and *Microsaccus longicalcaratus*. New combinations are as follows: *Habenaria Gibbsiae* (Rolfe), *H. kinabaluensis* (Kränzl.), *H. Stapfii* (Kränzl.), *Malaxis kinabaluensis* (Rolfe), *M. amplexans* (J. J. Sm.), *M. bidentifera* (J. J. Sm.), *M. cordifolia* (Rolfe), *M. incurva* (J. J. Sm.), *M. moluccana* (J. J. Sm.), *M. moluccana* var. *sagittata* (J. J. Sm.), *M. nigrescens* (J. J. Sm.), *M. obovata* (J. J. Sm.), and *M. xanthochila* (J. J. Sm.). In the paper on Philippine orchids one new genus, *Philippinaea* Ames & Schltr., is described, based on *Adenostylis Wenzelii*, with the following new combination: *Philippinaea Wenzelii* (Ames) Ames & Schltr. The following species are described as new: *Coclogyne quinquelamellata*, *Dendrochilum binuangense*, *D. ecallosum*, *D. niveum*, *D. propinquum*, *D. purpureum*, *Malaxis cuneipetala*, *M. propinqua*, *M. Taylorii*, *Oberonia leytenensis*, *O. surigaensis*, *Liparis jarensis*, *L. monophylla*, *L. rizalensis*, *Dendrobium busuangense*, *Agrostophyllum leytense*, *Spathoglottis Vanoverberghii*, *Bulbophyllum costatum*, *B. hortensoides*, *B. jarensis*, *B. masaganapense*, *B. philippinense*, *B. semiternum*, *Acriopsis floribunda*, *Saccolabium tenellum*, and *Taeniophyllum leytense*.—E. D. Merrill.

702. ANONYMOUS. [Rev. of: FAWCETT, WILLIAM, AND ALFRED BARTON RENDLE. *Flora of Jamaica, containing descriptions of the flowering plants known from the island*. Vol. 4. Leguminosae to Callitrichaceae. xv + 369 p., 114 fig. Trustees of British Museum: London, 1920.] Jour. Botany 58: 275-277. 1920.—See Bot. Absts. 7, Entry 1435; 8, Entry 703.

703. ANONYMOUS. [Rev. of: FAWCETT, W., AND A. B. RENDLE. *Flora of Jamaica, containing descriptions of the flowering plants known from the island*, Vol. 4. Leguminosae to Callitrichaceae. xv + 369 p., 114 fig. Trustees of British Museum: London, 1920.] Nature 105: 738. 1920.—See Bot. Absts. 7, Entry 1435; 8, Entry 702.

704. ANONYMOUS. [Rev. of: SMALL, JAMES. *The origin and development of the Compositae*. New Phytologist. Reprint No. 11. xi + 334 p. Wm. Wesley & Son: London, 1919.] Jour. Botany 58: 202-204. 1920.—See Bot. Absts. 7, Entry 333; 8, Entry 705.

705. ANONYMOUS. *Ancestral studies of Compositae*. [Rev. of: SMALL, JAMES.] *The origin and development of the Compositae*. New Phytologist. Reprint No. 11. xi + 334 p., 6 pl. Wm. Wesley & Son: London, 1919.] Nature 105: 450. 1920.—See Bot. Absts. 7, Entry 333; 8, Entry 704.

706. BALFOUR, I. BAILEY. *Some large leaved Rhododendrons*. Rhododendron Soc. Notes 1: 204-222. 1920.—An account of 14 species of the *Falconeri* series of the *Sciadendron* group with a key to the species. Four of the species are new, their technical description will appear in Notes Bot. Gard. Edinburgh.—Alfred Rehder.

707. BEAN, W. J. *The Fortunei group of Rhododendrons*. Rhododendron Soc. Notes 1: 187-194. 1919.—Notes on the taxonomy, history, and ornamental value of the 8 species constituting the *Fortunei* group are given and a key to the species appended.—Alfred Rehder.

708. VELLI, SAVERIO. *Lecture. L' "Althea taurinensis" DC. ed i suoi rapporti colle specie affini crescenti in Italia*. [Lecture. *Althea taurinensis* DC., its descriptions, together with those of related species growing in Italy.] Atti R. Accad. Sci. Torino 54: 291-314 (173-196). 6 fig. 1919.—A contribution toward clearing up the identity of closely related species of *Althea* from Italy. Detailed descriptions, citation of synonyms and exsiccatae, critical notes and remarks on the geographical distribution are given. The following new varieties are described: *Althea taurinensis* DC. var. *Cesatiana*, *A. taurinensis* DC. var. *Regoana*, and *A. taurinensis* DC. var. *dissecta*.—Harriet M. Libby.

709. BITTER, GEORG. *Discopodium penninervium* Hochst. var. *Holstii* (Damm.) Bitt., eine verkannte Pflanze aus Deutsch-Ostafrika. [*Discopodium penninervium* Hochst. var. *Holstii* (Damm.) Bitt., a misunderstood plant from German East Africa.] Bot. Jahrb. 57: 15-17. 1920.—The author discovered two herbarium specimens of a large solanaceous plant, bearing the unpublished name *Solanum Albersi* U. Dammer, which proved to be very hairy examples of another solanaceous species, *Discopodium penninervium*. A study of *Withania Holstii* Dammer showed that it too was identical with these two specimens. In the present paper this hairy form and three others are proposed as new varieties, namely: *Discopodium penninervium* var. *Holstii* (Damm.), var. *nervisequum*, var. *intermedium*, and var. *sparsearaneosum*, all from Africa.—K. M. Wiegand.

710. BLAKE, S. F. Nine new plants of the genus *Stylosanthes*. Proc. Biol. Soc. Washington [D. C.] 33: 45-54. 1920.—Nine new species of the genus *Stylosanthes* are described from material in the United States National Herbarium, as follows: *S. gloiodes* from Ecuador, *S. pliocata* from Brazil, *S. macrocarpa*, *S. diarthra*, *S. purpurata*, and *S. subsericea* from Mexico, *S. tuberculata* from Bahama Islands and Cuba, *S. floridana* from Florida, and *S. macrosoma* from Paraguay.—J. C. Gilman.

711. BOULENGER, G. A. On *Rosa britannica* Déséglise. Jour. Botany 58: 185-187. 1920.—This rose, having a wide distribution in England, has appeared under various names, as *R. tomentosa* Smith, *R. foetida* Bast., *R. scabriuscula* Smith, *R. Jundzilliana* Baker, and *R. silvestris* Woods. It has also been confused by Woods with *R. micrantha*. An extended description and discussion are given. The odor of the foliage in roses is not always connected with glands as usually stated in books. Completely smooth leaves of *R. dumetorum* had the apple scent of sweet briar, while very glandular specimens of *R. micrantha* were sometimes devoid of odor.—K. M. Wiegand.

712. BRITTEN, JAMES. *Eugenia lucida*. Jour. Botany 58: 151-152. 1920.—In making a list of LOUREIRO's plants in the National Herbarium the author has noted that an error was made by SEEMANN, who considered *Opa odorata* Lour. and *Syzygium lucidum* Gaertn. synonymous. A sheet in the Banksian Herbarium collected by BANKS on the Endeavour's River, New South Wales, on which GAERTNER based his name, was discovered by Britten, and is not *Opa odorata*.—K. M. Wiegand.

713. BRITTEN, JAMES. *Impatiens glandulifera* Royle (I. Roylei Walp.) forma alba. Jour. Botany 58: 201. 1920.—This form is described as new. It has been distributed by the author to various gardens in England and Ireland, and was also seen by him in the garden of Miss JEKYLL at Munstead.—K. M. Wiegand.

714. BROWN, N. E. New and old species of *Mesembryanthemum*, with critical notes. Jour. Linn. Soc. London Bot. 45: 53-140. Pl. 5-10. 1920.—A critical treatment of many old species of *Mesembryanthemum* and a description of over fifty new species.—A. J. Eames.

715. BROWN, N. E. A new species of *Lobostemon* in the Linnean Herbarium. Jour. Linn. Soc. London Bot. 45: 141-142. 1920.—*Lobostemon magnispalum* is described as new to science. It is a native of South Africa.—E. B. Payson.

716. CANDOLLE, C. DE. Piperaceae africanae. [Piperaceae of Africa.] Bot. Jahrb. 57: 18-19. 1920.—Three species of *Piper* are discussed and two of *Peperomia*. Of these *Piper Zenkeri* (Kamerun), *Peperomia kyimbilana* (North Nyassaland), and *P. Stolzii* (N. Nyassaland) are described as new.—K. M. Wiegand.

717. CLUTE, WILLARD N. The toad lily. *Tricyrtis hirta*. Amer. Bot. 26: 138-140. 1920.—A description of the flower.—S. P. Nichols.

718. COKER, W. C. *Azalea atlantica* Ashe and its variety *luteo-alba* n. var. Jour. Elisha Mitchell Sci. Soc. 36: 97-99. Pl. 1 (in color), 7. 1920.—This little-known species, abundant on the coastal plain of the Carolinas, is described, and a new variety, namely, *luteo-alba* is proposed.—W. C. Coker.

719. DENSLOW, H. M. Further reflections of an orchid-hunter. Jour. New York Bot. Gard. 21: 145-156. 1920.—The orchid flora even of the eastern states is not yet well known and much more information is needed on the life histories of various species. Herbaria do not contain sufficient specimens to indicate geographical distribution accurately. Field work on orchids must be prosecuted promptly and actively, since the orchid flora is rapidly disappearing.—H. A. Gleason.

720. ENGLER, ADOLPH, UND ERNST GILG. Syllabus der Pflanzenfamilien. [Syllabus of the families of plants.] 8vo, 8th ed., 395 p., 457 fig. Gebrüder Borntraeger: Berlin, 1919.—A comprehensive and epitomized survey of the families of plants from and including the Schizomycetes (Bacteria) to the Compositae of the Dicotyledons. There is included also a brief classification of vegetation from a geographical standpoint. Very few and but minor changes are made from the arrangement given in the seventh edition of this work.—E. B. Payson.

721. FERNALD, M. L. *Gaultheria procumbens* L., forma *suborbiculata*, n. f. *Rhodora* 22: 155-156. 1920.—An extreme form with strikingly large round leaves, collected in Harwichport, Harwich, Massachusetts.—James P. Poole.

722. FERNALD, M. L. *Lactuca hirsuta* Muhl., forma *calvifolia*, n. f. *Rhodora* 22: 156. 1920.—This new form differs from the typical *L. hirsuta* in the leaves being glabrous beneath and in some specimens extremely thin and membranous.—James P. Poole.

723. HAMET, RAYMOND. Sur un nouveau *Sedum* chinois de l'herbier du Museum d'Histoire Naturelle de Paris. [A new *Sedum* from China.] Bull. Soc. Bot. Genève 11: 146-150. 1919.—The new species, *Sedum Pinoyi* Hamet, is compared with other species of *Sedum* which are closely related to it.—W. H. Emig.

724. HITCHCOCK, A. S. Revisions of North American grasses: *Isachne*, *Oplismenus*, *Echinochloa*, and *Chaetochloa*. Contrib. U. S. Nation. Herb. 22: 115-208. Pl. 25-32, fig. 21-62. 1920.—Four papers are presented under this title. In the first, eight species of *Isachne* are described, each illustrated by a plate. In the second, four species of *Oplismenus* are described and figured. In the third paper, seven species of *Echinochloa*, one form of which has been cultivated in the United States under the names "billion dollar grass" and "Japanese barnyard millet," are described and figured. Several varieties of *E. crusgalli* are recognized and illustrated, and the following new names occur: *Echinochloa polytachya* (HBK.) Hitchc., *E. oplismenoides* (Fourn.) Hitchc., and *E. crusgalli crus-pavonis* (HBK.) Hitchc. In the fourth paper, twenty-six species of *Chaetochloa*, more widely known as *Setaria*, are described, and all, with the exception of *C. ambigua*, are represented by figures. The following new names occur: *Chaetochloa Poiretiana* (Schult.) Hitchc., *C. palmifolia* (Willd.) Hitchc. & Chase, *C. tenax* (L. Rich.) Hitchc., and *C. Scheelei* (Steud.) Hitchc. The treatment in each paper consists of a short introduction, a description of the genus with its synonyms, and a key to the species. Under each species the synonymy is given, in some cases very extensive, followed by the description and the citation of specimens.—S. F. Blake.

725. LADBROOK, JAMES. A new species of *Coupoui*. Jour. Botany 58: 176-177. 1920.—This new species, *C. micrantha*, was found in the British Museum herbarium among unnamed specimens of *Tabernaemontana*, and was collected by MARTIN in Guiana. This species adds a fourth to the three included in WERNHAM's account of *Coupoui* in Jour. Botany 58: 105-108. 1920.—K. M. Wiegand.

726. LINDAU, G. Acanthaceae africanae. X. [Acanthaceae of Africa. X.] Bot. Jahrb. 57: 20-24. 1920.—Eight species, in seven genera, are discussed, all new to science: *Hygrophila kyimbilensis* (N. Nyassaland), *Mellera menthiodora* (interior Africa), *Pseudobarleria glandulifera* (Southwest Africa), *Dyschoriste albiflora* (N. Nyassaland), *Barleria* (Eubarleria) *albida* (N. Hereroland), *Asystasia leptostachya* (Kamerun), *A. glandulifera* (Kamerun), and *Anisotes ukambanensis* (Massai Steppes).—K. M. Wiegand.

727. LINDMAN, C. A. M. *Svensk Fanerogamflora*. [Swedish phanerogamic flora.] 8vo, viii + 639 p., many fig. P. A. Norstedt & Söners: Stockholm, Sweden. 1918.—This is a comprehensive manual of the flowering plants of Sweden. The author gives a detailed key to families and distinctive genera based upon the sexual system of Linnaeus. Keys are also given, under the family description, to genera and species. The ENGLER and PRANTL sequence is followed in the arrangement of families. All species are at least briefly described and notes on distribution are included. The book is copiously illustrated with text figures. The following new species and subspecies are described: *Poa alpigena* (*Poa pratensis* L. var. *alpigena* Fries), *Puccinellia Borreri* (*Festuca Borreri* Bab.), *Festuca ovina* L. subsp. *duriuscula* (F. *duriuscula* L.), *Zerna inermis* (*Bromus inermis* Leyss.), *Z. ramosa* (*Bromus ramosus* Huds.), *Z. Benekeni* (*Bromus Benekeni* Syme), *Z. unioides* (*Bromus unioides* HBK.), *Agropyrum violaceum* (*Triticum violaceum* Horn?), *Scirpus atrichus* (*Trichophorum atrichum* Palla), *S. alpinus* (*Eriophorum alpinum* L.), *Betula coriacea* Gunnarss., *B. coriacea* var. *tremuloides* Gunnarss., *B. concinna* Gunnarss., *B. pubescens* Ehrh. subsp. *suecica* Gunnarss., *Atriplex praecox* Hülpfers, *Arabis suecica* (*A. thaliana* L. var. *suecica* Fr.), *Crataegus Palmstruchii*, *C. curvisepala*, *Trimorpha elongata* (*Erigeron elongatus* Ledeb.), *T. canadensis* (*Erigeron canadensis* L.). [See also Bot. Absts. 8, 686].—E. B. Payson.

728. MATTHEWS, J. R. Cheshire roses. Jour. Botany 58:137-141. 1920.—Notes on distribution and distinguishing characteristics are given on twenty-eight species and several varieties of roses occurring in Cheshire. The notes are partly from the author's material, and partly compiled from those of COLONEL WOLLEY-DOD.—K. M. Wiegand.

729. MERRILL, E. D. New or noteworthy Philippine plants, XV. Philippine Jour. Sci. 14: 365-457. 1919.—Besides 18 species previously unknown from the Philippines, the following are described as new to science: *Pandanus panayensis*, *P. camarinensis*, *Andropogon philippinensis*, *A. gryllus* L. var. *philippensis*, *Mariscus niveus* (*Schoenus niveus* Murr.), *Cryptocoryne aponogetifolia*, *C. pygmaea*, *Elatostema panayense*, *E. Macgregorii*, *E. zamboangense*, *E. acumatissimum*, *E. Robinsonii*, *E. pilosum*, *E. suborbiculare*, *E. diversilimbum*, *E. appendiculatum*, *Elatostematoides samarense*, *Aristolochia membranacea*, *Haematocarpus subpeltatus*, *Artabotrys monogynus*, *A. cagayensis*, *Goniothalamus lancifolius*, *G. longistylus*, *Mitrephora cagayensis*, *Oxymitra multinervia*, *O. platyphylla*, *Papualthia heteropetala*, *Phacanthus pubescens*, *P. villosus*, *Polyalthia dolichophylla*, *Pseuduvaria grandiflora*, *Uvaria panayensis*, *U. Macgregorii*, *Cryptocarya Ramosii*, *C. euphlebia*, *C. elliptifolia*, *Neolitsia lanceolata*, *N. paucinervia*, *Polyosma villosa*, *P. longipetiolata*, *Pittosporum pseudostipitatum*, *P. acuminatissimum*, *P. glaberrimum*, *Connarus castaneus*, *Rourea luzoniensis*, *Ormosia orbiculata*, *O. Clementis*, *O. basilanensis*, *O. grandifolia*, *Evodia sessilifoliola*, *Aglaia diffusiflora*, *Semecarpus subsessilifolia*, *S. ferruginea*, *Oncocarpus obovatus* (*Dichapetalum obovatum* Elm.), *Parishia oblongifolia*, *Villaresia philippinensis*, *V. latifolia*, *Miquelia philippinensis*, *Allophylus stenophyllus*, *Guioa parvifoliola*, *Elaeocarpus ilocanus*, *Pterospermum megalanthum*, *Dillenia megalophylla*, *Saurauia Santosii*, *Homalium Ramosii*, *Begonia Collisiae*, *B. lancilimba*, *B. obtusifolia*, *B. rubrifolia*, *B. serpens*, *B. panayensis*, *B. platyphylla*, *Cloëzia urdanetensis* (*Photinia urdanetensis* Elm.), *Tristania oblongifolia*, *Medinilla oblanceolata*, *Memecylon Ramosii*, *M. stenophyllum*, *Otanthera strigosa*, *Astronia brachybotrys*, *Schefflera obtusifolia*, *S. Alvarezii*, *S. globosa*, *S. platyphylla*, *S. Santosii*, *S. panayensis*, *Boerlagiodendron caudatum*, *Vaccinium ilocanum*, *Diplycosia glabra*, *Ardisia ilocana*, *A. longipetiolata*, *Amblyanthopsis crassifolia*, *Palaquium glabrifolium*, *Symplocos brachybotrys*, *Geniostoma pachyphyllum*, *Alyxia retusa*, *Rauwolfia membranacea*, *Tabernaemontana ecarinata*, *Callicarpa obtusifolia*, *Cyrtandra ilocana*, *C. panayensis*, *C. Santosii*, *C. lancifolia*, *Hemigraphis nummularifolia*, *Vernonia glandulifolia*.—Albert R. Sweetser.

730. MERRILL, E. D. Notes on the flora of Sumatra. Philippine Jour. Sci. 14: 239-250. 1919.—It is estimated that since the publication of MIGUEL's "Flora Sumatra" not over 500 species have been added, bringing the number of species of Spermatophytes to approximately 3000. From a collection by BARTLETT and LA RUE, aggregating about 500 numbers, several

species not previously credited to Sumatra are enumerated and a few new species are described. The following is a list of species new to science and new combinations included in the paper: *Oreocnide nivea*, *Litsea umbellata* (*Hexanthus umbellatus* Lour.), *Leca indica* (*Staphylea indica* Burm. f.), *Osmelia Bartlettii*, *Momecydon Laruei*, *Callicarpa brevipetiolata*, *Blumea pubigera* (*Conyza pubigera* L.).—Albert R. Sweetser.

721. MOORE, SPENCER LE M. *Alabastra diversa*.—Part XXXIII. Jour. Botany 58: 187-195, 219-226, 267-271. 1920.—1. Plantarum Mascarensium pugillus. The genera *Homaliopsis* (Flacourtiaceae) and *Vaughania* (Leguminosae, tribe Galegae) are described as new, and the following new species are proposed: *Homaliopsis Forbesii*, Madagascar; *Vaughania dionaeaeifolia*, Madagascar; *Noronhea comorensis*, Comoro Islands; *Lasiosiphon hibbertioides*, Madagascar. 2. Acanthaceae Papuanae. The genus *Hulemacanthus* (tribe Justiceae) is described as new, several known species are listed, and the following new species and varieties are proposed: *Hemigraphis suborbicularis*, Bismarck Archipelago; *H. Whitei*, Yule Island; *H. ciliata*, Mekeo District; *Pseudocranthemum confertum*, Yule Island; *P. Bradtkei*, Bismarck Archipelago; *P. Armitii*, Papua; *Justicia Chalmersii* Lind., var. *latifolia*, Sapphire Creek; *Justicia platyphylla*, Astrolabe Range; *Hulemacanthus Whitei*, Deva Deva. 3. Miscellaneous Africana. The following genera, species, and varieties are described as new: *Nectaropetalum congolense*, Mayumbe; *Umbellulanthus* gen. nov. (Erythroxylaceae), *U. floribundus*, Mayumbe; *Monocephalum* gen. nov. (Icacinaceae), *M. Batesii*, Cameroons; *M. Zenkeri*, Cameroons; *Stachyanthus nigeriensis*, S. Nigeria; *S. obovatus*, Mayumbe; *Pyrenacantha sylvestris*, Mayumbe; *Rhaphiostyles ferruginea* Engl., var. *parvifolia*; *Strombosia retevenia*, S. Nigeria; *S. majuscula*, Portuguese Congo; *S. torocensis*, Toro; *S. Grossweileri*, Mayumbe; *Strombosiopsis buxifolia*, Mayumbe; *Coula utilis*, Mayumbe; *Batesanthus intrusus*, Yaunde; *Anisopus Batesii*, Yaunde; *Aristolochia ceropegiioides*, Yaunde; *A. Ju-ju*, South Nigeria; *Drypetes peltophora*, Yaunde; *D. Taylorii*, E. Africa; *D. Grossweileri*, Portuguese Congo.—K. M. Wiegand.

722. PENNELL, FRANCIS W. *Scrophulariaceae of the southeastern United States*. Proc. Philadelphia Acad. Sci. 71: 224-291. 1919.—Extensive keys intended to "include all features of evident contrast" are given for the 38 genera and 123 species known to occur in the area from North Carolina to Florida and west to the Mississippi river. The work is based largely upon notes from fresh flowers. Habitat, distribution, date of flowering, color of corolla, and references to herbarium material are given for each species.—Leva B. Walker.

723. PUGSLEY, H. W. *Plantago alpina* and *P. maritima*. Jour. Botany 58: 149-150. 1920.—It is often with difficulty that dwarf plants of *P. maritima* are distinguished from plants of *P. alpina*. In the spring, however, when growth is beginning the two species can be more clearly differentiated. The author discusses these structural and habitat differences as based on plants growing in his garden, where *P. alpina* flowers earlier and more sparingly than *P. maritima*.—K. M. Wiegand.

724. REHDER, ALFRED. *New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum*. Jour. Arnold Arboretum 2: 121-128. 1920.—The present article contains two new species of *Lonicera*, *L. subsessilis* from Korea and *L. demissa* from Japan, and the following hybrids, species and varieties based on cultivated plants: \times *Prunus Arnoldiana*, \times *P. Meyeri*, *P. Padus* var. *laxa*, *Acanthopanax ternatus*, \times *Viburnum Jackii*, and *Physocarpus intermedius* f. *parvifolius*.—Alfred Rehder.

725. RIDLEY, HENRY N. *Plantago Cynops* L. in Kent. Jour. Botany 58: 271-272. 1920.—The above species, a native of the chalk barrens of southern Europe, was found by CHARLES BAKER on similar chalk downs between Cobham and Meopham in Kent. It is apparently entirely absent from northern France. The Kent downs are peculiar in harboring other plants that are rare in England.—K. M. Wiegand.

736. ROBINSON, B. L. Further diagnoses and notes on tropical American Eupatorieae. Contrib. Gray Herb. N. S., 61: 3-30. 1920.—The following new genus, new species and varieties, new names and combinations occur: *Ageratum rivale*, *Alomia chiriquensis*, *Eupatorium aequinoctiale*, *E. Blakei*, *E. eucosum*, *E. gymnoxymorphum* Rusby (*E. gymnoxoides* Rusby), *E. huigrense*, *E. Kalenbornianum*, *E. longipetiolatum* Sch. Bip. var. *typicum*, *E. longipetiolatum* Sch. Bip. var. *arbusculare*, *E. pichinchense* HBK. forma *typicum*, *E. pichinchense* HBK. forma *glandulare*, *E. polopolense*, *E. prionophyllum* Robinson var. *typicum*, *E. prionophyllum* Robinson var. *asymmetrum*, *E. trinitense* Rusby & Robinson (*Baccharis trinitensis* Ktze.), *Mikania amblyolepis*, *M. Andrei*, *M. bullata*, *M. clematidiflora* Rusby, *M. filicifolia*, *M. flabellata* Rusby, *M. globifera* Rusby, *M. gracilipes*, *M. Hioramii* Britton & Robinson, *M. Jamesonii*, *M. lancifolia*, *M. ligustrifolia* DC. var. *subsessilis*, *M. Mathewsii*, *M. miconioides*, *M. Pennellii*, *M. rugosa*, *M. Seemannii*, *M. tarapotensis*, *M. trachodes*, *M. vitrea*, *Sphaereupatorium* Ktze., *S. Hoffmannii* Ktze., *Ophryosporus eleutherantherus* (*Eupatorium eleutherantherum* Rusby), *Eupatorium nicaraguense*.—E. B. Payson.

737. ROBINSON, B. L. The Eupatoriums of Bolivia. Contrib. Gray Herb. N. S., 61: 30-80. 1920.—The author gives a brief historical account of the progress of taxonomy in Bolivia with particular reference to species of *Eupatorium*, of which 68 species are now known to occur in Bolivia. Of these, 29 are known only from Bolivia. There is reason to suppose that of the Eupatoriums indigenous to Bolivia a great part are still to be discovered. In the present paper the species are grouped under the sections to which they are referred and subsectional keys given to the species. Species previously undescribed in the present series of papers are accompanied by a complete diagnosis. Specimens are cited for all species. The following new varieties and forms and new combinations are included: *Eupatorium tunariense* (*E. conyzoides* [Vahl] Ktze. var. *tunariense* Hieron.), *E. patens* D. Don var. *typicum*, *E. pyramidale* Klatt var. *angustifolium* (*E. amygdalinum* Lam. var. *revolutum* [Pohl] Bak. forma *angustifolium* Hieron.), *E. rufescens* Lund. var. *typicum*.—E. B. Payson.

738. RYDBERG, PER AXEL. Rosales. Fabaceae: Psoraleae. North Amer. Flora [New York] 24: 65-136. 1920.—The author completes the treatment of the genus *Parosela* and elaborates the genera *Thornbera*, *Petalostemon*, and *Kuhnistera*. The following new species are described and new combinations made: *Parosela lagopina*, *P. exserta*, *P. Barberi* Rose, *P. lucida* Rose, *P. fissa*, *P. Bigelovii*, *P. pilifera*, *P. Townsendii*, *P. ervoides* (*Dalea ervoides* Benth.), *P. costaricana*, *P. leporina* (*Psoralea leporina* Ait.), *P. alopecuroides* (*Dalea alopecuroides* Willd.), *P. Thouini* (*Dalea Thouini* Schrank), *P. flava* (*Dalea flava* Mart. & Gal.), *P. elata* (*Dalea elata* H. & A.), *P. roseola*, *P. citrina*, *P. caudata*, *P. attenuata*, *P. bicolor* (*Dalea bicolor* Willd.), *P. quinqueflora* (*Dalea quinqueflora* Brand.), *P. Lloydii*, *P. laxa*, *P. minutifolia*, *P. Conzattii*, *P. tuberculina*, *P. fulvosericca*, *P. polycephala* (*Dalea polycephala* Benth.), *P. decora* (*Dalea decora* S. Schauer), *P. dorycnoides* (*Dalea dorycnoides* DC.), *P. pilosissima*, *P. abietifolia* Rose, *P. subvillosa*, *P. scariosa* (*Dalea scariosa* S. Wats.), *P. trifoliolata* (*Dalea trifoliolata* Moric.), *P. reclinata* (*Psoralea reclinata* Cav.), *P. versicolor* (*Dalea versicolor* Zucc.), *P. tsugoides*, *P. megalostachys* Rose, *P. sanctae-crucis*, *P. leucantha*, *P. sessilis* (*Dalea Wislizeni* var. *sessilis* A. Gray), *P. leucosericea*, *P. longifolia* Rose, *P. roseiflora*, *P. Smithii*, *P. glabrescens*, *P. involuta*, *P. melantha* (*Dalea melantha* S. Schauer), *P. fuscescens*, *P. zinapanica* (*Dalea zinapanica* S. Schauer), *P. diversicolor*, *P. argyrostachya* (*Dalea argyrostachya* H. & A.), *P. Botterii*, *P. gigantea* Rose, *P. atrocyanea*, *P. Wardii*, *P. caudata*, *P. capitulata*, *P. tehucana*, *P. emphysoles* (*Psoralea emphysoles* Jacq.), *P. scandens* (*Psoralea scandens* Mill.), *P. floridana*, *P. humilis* (*Psoralea humilis* Mill.), *P. vulneraria* (*Dalea vulneraria* var. *typica* Oerst.), *P. occidentalis*, *P. platyphylla*, *P. barbata* (*Dalea vulneraria* var. *barbata* Oerst.), *Thornbera lutea*, *T. Watsoni* (*Parosela Watsoni* Rose), *T. villosa*, *T. leucantha*, *T. Ordiae* (*Dalea Ordiae* A. Gray), *T. Grayi* (*Parosela Grayi* Vail), *T. revoluta* (*Dalea revoluta* S. Wats.), *T. Pringlei* (*Dalea Pringlei* A. Gray), *T. Nelsonii* (*Dalea Nelsonii* Rose), *T. pumila*, *T. Dalca* (*Psoralea Dalea* L.), *T. robusta*, *Petalostemon truncatus*, *P. sonora*, *P. pilulosus*, *P. confusus*, *P. evanescens* Rose (*Dalea evanescens* Brand.), *P. obreniformis*, *P. Standleyanus*, *P. lagopus*, *P. Rothrockii*, *Kuhnistera adenopoda* (*Petalostemon corymbosum* var. *adenopodum* B. L. Robinson).—E. B. Payson.

739. SALMON, C. E. *Ranunculus Lingua*. Jour. Botany 58: 275. 1920.—The occurrence of *R. Lingua* var. *glabratus* Wallr. is recorded in Great Britain.—K. M. Wiegand.

740. SARGENT, C. S. Notes on North American trees VII. Jour. Arnold Arboretum 2: 112-121. 1920.—This article deals with *Prunus* and *Aesculus* and the following new combination and new varieties and one new hybrid are proposed: *Prunus americana* var. *floridana*, *P. mexicana* var. *reticulata* (Sarg.), *P. mexicana* var. *polyandra* (Sarg.), *P. mexicana* var. *fulltonensis* (Sarg.), *P. virginiana* var. *demissa* f. *pachyrrhachis* (Koehne), *P. virginiana* var. *melanocarpa* (A. Nels.), *P. virens* var. *rufula* (Wooton & Standl.), *Aesculus octandra* var. *virginica*, *A. georgiana* var. *lanceolata*, × *A. mississippiensis*. (See also Bot. Absts. 1, Entries 812, 1127, 1128; 3, Entry 1837; 4, Entry 1766; 7, Entry 2232.)—Alfred Rehder.

741. SCHNEIDER, CAMILLO. Notes on American willows X. Jour. Arnold Arboretum 2: 65-90. 1920.—The present article deals with the sections *Fulvae* and *Roseae* each containing 3 species, with 2 species of doubtful affinity and a species of the section *Glaucæ* omitted from the treatment of that section. As in the preceding articles the synonymy, nomenclature, distribution and relationship of the species and varieties are discussed at length and the following new combinations proposed: *Salix Bebbiana* var. *perrostrata* (Rydb.), *S. Geyeriana* var. *argentea* (Bebb), and *S. Scouleriana* var. *Austinae* (Bebb). (See also Bot. Absts. 1, Entries 801, 813; 3, Entries 1838, 1839; 4, Entries 1769, 1770; 7, Entries 1490, 2238, 2239.)—Alfred Rehder.

742. STANDLEY, PAUL C. A new species of *Campnosperma* from Panama. Jour. Arnold Arboretum 2: 111-112. 1920.—*Campnosperma panomensis* is described as a new species of a genus known before in America only from a single Brazilian species.—Alfred Rehder.

743. STANDLEY, PAUL C. Six new species of plants from Mexico. Proc. Biol. Soc. Washington [D. C.] 33: 65-68. 1920.—Four plants belonging to the family Polygonaceae one to the Aristolochiaceae and one to the Hydrangeaceae are described from Mexico as new species. They are: *Aristolochia malacophylla*, *Podopterus cordifolius*, *Ruprechtia occidentalis*, *Coccoloba acapulcensis*, *C. chiapensis*, and *Fendlerella lasiopetala*.—J. C. Gilman.

744. STANDLEY, PAUL C. Trees and shrubs of Mexico (Gleicheniaceae-Betulaceae). Contrib. U. S. Nation. Herb. 23: 1-169. 1920.—This paper forms the first part of a volume intended to provide a keyed synopsis of the woody plants of Mexico, and an account of their local names and uses. After a short introduction describing the general features of Mexican botany, the plan of the work is discussed, and a short history of the early botanical exploration of Mexico up to the time of HUMBOLDT is given. This is followed by a key to the families. Under the families keys are given to the genera and species, and under each species a brief description is generally given. The chief synonymy is included under each species, with an account of the range and the local names and uses. The ferns have been treated by W. R. MAXON, the grasses by A. S. HITCHCOCK, and the Amaryllidaceae by W. TRELEASE. The larger genera included in this part of the work are the following: *Agave*, with 170 species; *Piper*, with 59; *Pinus*, with 26; and *Chamaedorea*, with 25. The following new species and new names occur: *Inodes mexicana* (Mart.) Standl., *I. japonica* (C. Wr.) Standl., *Yucca jaliscensis* Trel., *Agave panamana* Trel., *A. stringens* Trel., *A. subtilis* Trel., *A. pedrosana* Trel., *A. Gutierreziana* Trel., *A. palmaris* Trel., *A. rhodacantha* Trel., *A. pes-mulae* Trel., *A. pacifica* Trel., *A. pseudodequilana* Trel., *A. Sullivanii* Trel., *A. yaquiana* Trel., *A. rasconensis* Trel., *A. guadalajarana* Trel., *A. felina* Trel., *A. subzonata* Trel., *A. mapisaga* Trel., *A. Bourgaei* Trel., *A. mirabilis* Trel., *A. abrupta* Trel., *A. Wercklei* Weber, *A. flexispina* Trel., *A. Eduardi* Trel., *A. pedunculifera* Trel., *A. poterana* Trel., *A. inopinabilis* Trel., *A. conwallis* Trel., *A. dissimulans* Trel., *A. angustiarum* Trel., *A. victoriae-reginae* f. *Nickelsi* (Roland-Gosselin) Trel., *A. Mulfordiana* Trel., *A. Schottii* var. *atracha* Trel., *A. angustissima* var. *Ortgiesiana* (Baker) Trel.—S. F. Blake.

745. STEPHENSON, T., AND T. A. STEPHENSON. A new marsh Orchis. Jour. Botany 58: 165-170. 3 fig. 1920.—*Orchis purpurella* is described as new, consisting of two forms desig-

nated as A and B. Four points are given special attention: Form of the lip, its color, spots on the leaves, and dwarf habit. These are discussed in relation to various closely related species, as *O. salina* Turcz., *O. cruenta* Müll., *O. Fuchsii* Druce, *O. ericetorum* Linton, *O. praetermissa* var. *pulchella* Druce, *O. latifolia* L., and *O. incarnata*, with the conclusion that *O. purpurella* is a valid species, differing from the above species by the characters given. The form B is closely related to *O. cruenta* but can scarcely be referred to it, neither is it a dwarf form of *O. latifolia*. Hybrids of *O. purpurella* with a dwarf form of *O. latifolia* and with *O. ericetorum* are noted. The forms described may have arisen by crossings of *O. incarnata* or *O. praetermissa* with *O. latifolia* or *O. maculata*, but the theory is favored that they are mutations from *O. incarnata*.—K. M. Wiegand.

746. STEPHENSON, T., AND T. A. STEPHENSON. The genus *Epipactis* in Britain. Jour. Botany 58: 209-213. Pl. 555. 1920.—A critical study of *Epipactis* and *Orchis* extending over several years resulted in a paper too large to publish as a whole. The present article contains the important conclusions with respect to *Epipactis*. Five species are recognized for Britain: *E. palustris* Crantz, *E. atropurpurea* Raf., *E. viridiflora* Rehb., *E. purpurata* Sm., and *E. latifolia* Allm. The distinguishing features between the species are noted and discussed. *E. latifolia* should include *E. media* Fries and *E. atroviridis* Linton. The conclusion is reached that lip-bosses and details of leaf-scheme on which the last two species' names were founded are very unstable and of no value as specific characters. These two names should be dropped. It is not believed that *E. media* and *E. atroviridis* are hybrids, as they do not behave like other hybrids with which the authors are acquainted.—K. M. Wiegand.

747. STEPHENSON, T., AND T. A. STEPHENSON. The British palmate orchids. Jour. Botany 58: 257-262. 1 pl. 1920.—This is a summary of several years' work on the marsh and spotted orchids. Notwithstanding the great number of forms which more or less intergrade, certain "landmarks" or species and certain hybrids may be recognized. The British palmate orchids comprise the following species: *Orchis incarnata* L., *O. purpurella* Stephenson, *O. ericetorum* Linton, *O. praetermissa* Druce, *O. latifolia* L., and *O. Fuchsii* Druce. The characteristics of each of these is discussed, and reasons given for the belief that they are true species. The colored plate which serves to illustrate previous papers by these authors as well as papers to follow, is discussed in detail, and the differences between the species and peculiarities of the hybrids as they appear in the plate are pointed out.—K. M. Wiegand.

748. SVENSON, H. K. A northeastern variety of *Panicum*. Rhodora 22: 153-155. 5 fig. 1920.—The author describes *Panicum dichotomiflorum* Michx. var. *puritanorum*, n. var., from Massachusetts.—James P. Poole.

749. SWINGLE, WALTER T. A new species of *Pistacia* native to southwestern Texas, *P. texana*. Jour. Arnold Arboretum 2: 105-110. 1920.—The *Pistacia* of southwestern Texas and northern Mexico formerly included under *P. mexicana* HBK. is described as a new species, *P. texana*.—Alfred Rehder.

750. VICIOSO, CARLOS. Una especie nueva del genero *Gypsophila*. [A new species of the genus *Gypsophila*.] Bol. R. Soc. Española Hist. Nat. 19: 493-494. 1919.—*Gypsophila Ceballosi* Pau & C. Vic., collected in Escorial, central Spain.—O. E. Jennings.

751. VISCHER, W. Sur les *Quararibea* Aubl. un genre de Bombacées à ovaire infère. [Concerning the species of *Quararibea* Aubl. a genus of the family Bombacaceae with inferior ovaries.] Bull. Soc. Bot. Genève 11: 199-210. 5 fig. 1919.—The characteristics of the various types of flowers of the genus *Quararibea* are given. A number of new combinations are introduced and a new species, *Quararibea Chodati* Vischer, is described.—W. H. Emig.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*S. F. TRELEASE, *Assistant Editor*

752. ANONYMOUS. **Turning a liability into an asset.** *Sci. Amer. Monthly* 2: 129. 1920.—The commercial possibilities of the water hyacinth (*Eichornia crassipes*) are discussed.—*Chas. H. Otis.*

753. ANONYMOUS. [Rev. of: SPITTA, E. J. **Microscopy: the construction, theory, and use of the microscope.** 3d ed., xxviii + 537 p., 28 pl. John Murray: London, 1920.] *Nature* 106: 77-78. 1920.—In the present edition may be noted especially the reference to low power objectives designed to give great depth of focus and a flat field. The book is illustrated by a considerable number of new plates.—*O. A. Stevens.*

754. DURAND, R. **Bactéries et papier-monnaie.** [Bacteria and paper money.] *Bull. Sci. Pharm.* 27: 357-358. 1920.—A single bill of paper money may contain as many as 100,000 bacteria. These belong chiefly to the bacteria of the intestinal flora, but bacilli communicating contagious diseases were also found.—*H. Engelhardt.*

755. INGLE, HARRY. **The oil industry.** [Rev. of: MARTIN, GEOFFREY. **Animal and vegetable oils, fats, and waxes: their manufacture, refining, and analysis, including the manufacture of candles, margarine and butter.** A practical treatise. x + 218 p. Crosby Lockwood and Son: London, 1920.] *Nature* 106: 43-44. 1920.

756. SIMMONDS, C. **Possible new sources of power alcohol.** *Nature* 106: 244-245. 1920.—Two reports of British committees are referred to. Foodstuffs will probably be too valuable for yet some time for use on any large scale as sources of alcohol. It has been suggested that there is in Ireland considerable waste land which could be used for crops to be used in this way, and some work has been started in this direction. In tropical regions cassava, arrowroot, and maize might be practicable. One plant (*Polymnia edulis*) from the Andes is said to be under trial in France. Utilization of cellulose materials, such as straw and sawdust, is also considered.—*O. A. Stevens.*

757. SLADE, R. E., AND G. I. HIGSON. **A simple apparatus for high-power photomicrography.** *Sci. Prog.* [London] 14: 645-646. 1920.—An apparatus designed for the rapid production of photomicrographs of emulsions.—*J. L. Weimer.*

758. SPRINGER, J. F. **Water pipes of wood.** *Sci. Amer.* 123: 250, 262, 264. 3 fig. 1920.

759. TEVIS, M. **Forty centuries ago—and now.** *Sci. Amer.* 123: 397. 1920.—The paper concerns the possibility of again making paper from *Papyrus*.—*Chas. H. Otis.*

760. WINTERS, S. R. **Binder twine from Florida.** *Sci. Amer.* 123: 379. 2 fig. 1920.—A brief article on sisal.—*Chas. H. Otis.*

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ENTRIES 761-1582

AGRONOMY

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761. ANONYMOUS. El cultivo del henequen en Yucatán, su posible introduccion en el estado de Michoacan. [Henequen in Yucatan and its possible introduction into Michoacan.] Michoacan Agric. [Mexico] 1¹: 4-5; 1²: 4-5; 1³: 5-6. 1920.—Popular information.—*John A. Stevenson*.

762. ANONYMOUS. Cultivo de la papa. [Potato cultivation.] Michoacan Agric. [Mexico] 1⁴: 7; 1⁵: 5-6. 1920.—Popular information.—*John A. Stevenson*.

763. ANONYMOUS. El cultivo del tabaco en España. [Tobacco cultivation in Spain.] Informacion Agric. [Madrid] 10: 484-486. 1920.—An outline of a proposed plan for growing tobacco under government supervision, with guaranteed returns to growers.—*John A. Stevenson*.

764. ANONYMOUS. Flax growing. Jour. Dept. Agric. Ireland 20: 520-523. 1920.

765. ANONYMOUS. [Rev. of: GEHRS, J. H. Productive agriculture. xii + 444 p. The Macmillan Co.: New York, 1918.] Sci. Prog. [London] 15: 148. 1920.

766. BAILEY, E. M. Report on commercial feeding stuffs. 1919. Connecticut [New Haven] Agric. Exp. Sta. Bull. 221. 345-393. 1920.—The analyses of 204 samples of feeds are given as required by State law. These analyses are preceded by a general discussion of the determining factors in compounding rations and definitions of feeding stuffs, as revised to Jan., 1919, and adopted by the Association of Feed Control Officials of the United States.—*Henry Dorsey*.

767. BARBER, C. A. Sugar production in India. Louisiana Planter and Sugar Manufacturer 64: 286. 1920.—While the acreage in sugar cane in India is very large, the production of sugar is very low. This is largely due to climatic conditions which prevent the growing of varieties which have been found most satisfactory in other countries.—*C. W. Edgerton*.

768. BARBILLION, M. Possibilities of new fibres for pulp and paper making. Paper 26²¹: 11-12, 32. 1920.—This article discusses esparto, bamboo, papyrus, broom, nettle, and other plants which are grown in France or its colonies and possess paper-making possibilities.—H. N. Lee.

769. BECKER-DILLINGEN, J. Serologische Untersuchungen auf dem Gebiete von Pflanzenbau und Pflanzenzucht. [Serum investigations in the field of plant structure and plant breeding.] Landw. Jahrb. 53: 245-276. 1919.—The author uses the serum and antigene method to determine impurities in meal and in seeds. He describes in detail the methods of preparing the antigene and the serum and reviews the literature. He finds that it is possible to make a quantitative determination of the amounts of *Agrostemma githago* seed in meal, an admixture of 0.125 per cent giving a specific reaction. Other common weed seeds as well as mixtures of weed seeds were studied with similar conclusions. The source of red clover seed could be determined in this way by noting the specific reaction due to the presence of characteristic weed seeds. By this method the seeds of *Brassica napus* could be distinguished from those of *Brassica rapa*, and the author was even able to distinguish between 2 different varieties of barley by making a serum test with the ground seed. All methods are described in detail since much of the success of the operation is said to depend on the proportions of antigene and serum.—A. J. Pieters.

770. BERRY, REGINALD ARTHUR. Composition and properties of oat grain and straw. Jour. Agric. Sci. 10: 359-414. Fig. 1-5. 1920.—An extensive study with detailed chemical analyses of the composition of oat grain and straw. Changes during growth, varietal differences, and a large number of correlations of various properties are brought out.—V. H. Young.

771. CERECEDA, J. DANTIN. Catalogo methodico de las plantas cultivadas (especies y variedades) en España y de las principales especies arboreas. [Methodical catalogue of the plants (species and varieties) cultivated in Spain, and of the principal tree species.] 62 p., 22 fig. Servicio de Publicaciones de Agricolas del Ministerio de Fomento: Madrid, 1920.—The classified list gives the botanical and common names for each species and variety cultivated in Spain. The species are grouped according to economic use except in the case of fruit trees, which are exemplified by olive and oranges, and sugar and cereals, which are grouped with reference to climatic adaptations.—C. V. Piper.

772. CLAYTON, E. S. Field experiments with maize. Grafton experiment farm, 1919-1920. Agric. Gaz. New South Wales 32: 1-6. 1921.—In the experiment, hilling vs. flat cultivation of maize, hilling was done by the plow and by disc cultivating. Hilling by plowing decreased the crop but hilling by disc cultivating showed a net increase of crop over the check plats. The main advantage of hilling is that it smothers weeds in the row.—An experiment in de-suckering Leaming maize showed a net loss of about \$1.40 per acre.—In depth of cultivation experiments, deep cultivation during season and deep cultivation followed by shallow cultivation were compared with continuous shallow cultivation. Deep cultivation resulted in loss, and deep followed by shallow cultivation resulted in a small net gain.—In green manuring experiments, the object was to determine value of green manures sown in standing maize at tasseling time where maize is grown as a continuous crop. In the first year of experimenting, rape, vetches, and Grey field peas were used as green manuring crops; yields, when compared with plat receiving usual treatment, were not lessened the first year.—In a late cultivation experiment, maize received no cultivation after hilling (crop 18 inches high) in comparison with usual cultivation after hilling. The latter showed marked net gain per acre.—In rate of seeding trials with 2 varieties, the heavier seedings gave greatest net increases per acre.—L. R. Waldron.

773. CROCKER, WILLIAM. Influence of a crop on succeeding one. [Rev. of: (1) HARTWELL, B. L., and S. C. DAMON. The influence of crop plants on those which follow. Rhode Island Agric. Exp. Sta. Bull. 175. 1918. (2) HARTWELL, B. L., F. R. PEMBER, and G. E. MERKLE. The influence of crop plants on those which follow. Rhode Island Agric. Exp. Sta. Bull. 176. 1919 (see Bot. Absts. 6, Entry 18).] Bot. Gaz. 68: 480-482. 1919.

774. CROSS, WILLIAM E. *Ensayos con abonas para la caña de azúcar*. [Fertilizers for sugar cane.] Sugar 21: 267-271. 1919.—A discussion of the fertilizer experiments at the Tucuman (Argentina) Experiment Station.—*C. W. Edgerton*.

775. CROSS, WILLIAM E. Fertilizer experiments with sugar cane in 1918-19. Sugar 21: 633-634, 651. 1919. [A translation from Rev. Indust. Agric. Tucuman 9: Nos. 11-12, 1919.]—A discussion of the effect of various fertilizers upon the development of sugar cane and upon the root-rot disease.—*C. W. Edgerton*.

776. CROSS, WILLIAM E. The 1919 Tucuman sugar crop. Louisiana Planter and Sugar Manufacturer 64: 364-366. 2 fig. 1920.—Tucuman produced 3,685,000 tons of sugar cane in 1919, this crop being much larger than each of several preceding crops. This increased production is said to be due to the fact that the planters have replaced the native canes with Java seedlings. The Java seedlings are more resistant to the attacks of insects and fungous diseases. Neither mosaic nor root-rot seems to seriously damage these canes.—*C. W. Edgerton*.

777. CROSS, WILLIAM E. The treatment of cane damaged by frost. Louisiana Planter and Sugar Manufacturer 65: 363-366. 1 fig. 1920.—A discussion of the methods to be used in harvesting frosted cane and of the difficulties that arise during the manufacture of sugar from such cane.—*C. W. Edgerton*.

778. EDQUIST, ALF. G. Vitality of seeds. Trans. and Proc. Roy. Soc. South Australia 40: 5-10. 1919.—As a result of preliminary experiments on the storage of dry grain, it has been found that perfectly ripe dry grain can be stored in an atmosphere of nitrogen or of carbon dioxide without injury to the grain; at the same time the eggs of weevils and other beetles are prevented from developing. It is maintained that such a method of storage can be provided economically.—*J. H. Faull*.

779. FRUWIRTH, C. *Handbuch des Hülsenfruchterbaues*. [Handbook of legume culture.] viii + 231 p., 231 fig. Paul Parey: Berlin, 1921.—This work is in reality a third revised and enlarged edition of the author's "Anbau der Hülsenfrüchte." The general part considers such topics as morphology, physiology, cultural requirements, utilization and agricultural importance. The special part treats in detail many of the legume crop plants, including serradella, lupines, square-pod pea, chick-pea, vetches, lentils, vetchlings, peas, soybean, kidney bean, scarlet runner, mung, urd, lima bean, cowpea, and bonavist.—*C. V. Piper*.

780. GIL, MIGUEL. El problema del trigo-fertilización. [The problem of wheat fertilization.] Informacion Agric. [Madrid] 10: 482-484. 2 fig. 1920.—The results of tests with sodium nitrate are given.—*John A. Stevenson*.

781. GILMORE, MELVIN RANDOLPH. Uses of plants by the Indians of the Missouri River region. 33rd Annual Report of the Bureau of American Ethnology 1911-12: 43-154. 30 pl. Washington, D. C., 1919.—This is a list of the various plants, together with methods of utilization, used by the Indians in the region studied, being a continuation of similar accounts of other tribes (see Bureau of Ethnology Bull. 55, and 30th Rept.). A glossary of Indian, English, and scientific names of the plants mentioned is appended; also a bibliography of historical writers quoted.—*Lyman Carrier*.

782. GRAY, G. P. Weed control along fencerows and roadways. Monthly Bull. Dept. Agric. California 8: 599-603. 1919.—Refers to Publications in Agricultural Science, University of California, Vol. 4, No. 2, 1919. [See Bot. Absts. 3, Entry 470.]—*E. L. Overholser*.

783. GRIMME, CLEMENS. Ueber Mulatinhos, eine neue brasilianische Speisebohne. [Concerning mulatinhos, a new Brazilian edible bean.] Pharm. Zentralhalle 61: 421-423. 1920.—A chemical study of the mulatinhos bean is given. The bean, apparently a variety of *Phaseolus vulgaris* sub-spec. *compressus*, is small, light brown, and flat with a polished

seed-coat and a white, dark-bordered hilum. It is 10 mm. long, 6 mm. wide, and 3-5 mm. thick. The bean was found to contain 11 per cent of water, 89 per cent of dry substance, 85 per cent of organic substance, 34 per cent of crude protein, 2 per cent of fat, 46.4 per cent of nitrogen-free extract, 3.5 per cent of crude fiber, and 3.6 per cent of ash. After treating with water and then boiling, the contents were found to consist of 69.5 per cent of water, 30.5 per cent of dry substance, 29.6 per cent of organic substance, 10 per cent of crude protein, 0.35 per cent of fat, 18 per cent of nitrogen-free extractive matter, 1.16 per cent of crude fiber, and 0.9 per cent of ash. After boiling with sodium carbonate the respective figures were 75.1, 24.9, 24.1, 7.9, 0.17, 15.2, 0.82, and 0.8 per cent.—*H. Engelhardt*.

784. GROUND, CHARLES. Ramie and textile nettles as paper fiber. Paper 26¹⁸: 15-16, 30. 1920. [Translation from *Le Papier*, April, 1920.]

785. GUZMANES, ANTONIO. La inmersión de las semillas en líquidos nutritivos. [Soaking seed in nutritive solutions.] *Informacion Agric.* [Madrid] 10: 480-481. 1920.—Seed barley soaked in a solution of ammonium nitrate or in a solution of potassium nitrate for various lengths of time gave lower yields than untreated seed.—*John A. Stevenson*.

786. GUZMANES, ANTONIO. El cultivo del arroz en Valencia. [Rice cultivation in Valencia.] *Informacion Agric.* [Madrid] 10: 453-457. 8 fig. 1920.

787. HARRIS, F. S. The American sugar-beet seed industry. *Sugar* 22: 68-69, 81. 5 fig. 1920.

788. HEIM, F., J. MAHEU, AND L. MATROD. Suitability of bagasse as a source of paper. Paper 26²³: 11-14, 36. 14 fig. 1920.—[Translation from *La Papeterie* 62: June-July, 1920.] A complete description of the histology of the stem, giving dimensions of the elements, the chemistry and microchemistry of the fiber, and properties and uses of pulp obtained therefrom.—*H. N. Lee*.

789. HODSON, E. A. Results of seven year's selection in Trice cotton. *Arkansas Agric. Exp. Sta. Bull.* 171. 27 p., 10 fig. 1920.—Seven years of continuous selection in Trice cotton showed that wide fluctuations occurred which emphasize the need of continuous selection in order to preserve the characters of the strain.—*John A. Elliott*.

790. JONES, D. F. Producción de semillas para sembrar. [Seed production.] *El Agricultor* [Santiago, Chile] 5: 7-12. 8 fig. 1920.—[Reprinted from *La Hacienda*.]

791. JONES, J. S., C. W. COLVER, AND H. P. FISHBURN. The protein content of wheat grown with irrigation. *Jour. Agric. Sci.* 10: 290-332. Fig. 1-11. 1920.—The published data on the subject of protein content of wheat are very conflicting and the authors conducted a series of experiments during the years 1910-1916, inclusive, in an attempt to elucidate the problem. The work was carried out at Gooding, Idaho, in the Snake River valley. This is a region of low precipitation and for this reason the water applied to the crop as irrigation water was practically all that it received. Soils used varied from raw sagebrush land to that cultivated under rotation with legumes and other crops. Analyses of the nitrate and other mineral content of the soils were made and the effects of cropping, rotation, leaching, etc., were determined. Both the grain and the flour produced were analyzed throughout the experiments. Authors' results do not coincide with those obtained in many other experiments. They find that in general the wheat grown in the Snake River plains is soft, starchy, and low in protein content and of low value for milling purposes. It should not be assumed, however, that irrigation is the controlling factor in determining the protein content of wheat. Raw sage-brush soils, the nitrogen content of which is always low, produce wheat low in protein content regardless of the amount of water applied. As soon as such lands are cultivated to wheat in a rotation with alfalfa or red clover, a much better quality of wheat is produced, as such soils have a relatively higher nitrogen content and the protein

content of the wheat is correspondingly improved. Carelessness in the use of water may offset, to some extent, other favorable conditions since the maximum protein content was never obtained with the greatest amounts of irrigation water. Deterioration of seed due to growth in irrigated regions has no effect upon protein content of the crop and there is no advantage in securing seed from non-irrigated regions. However, there is much to be gained in selecting varieties of wheat having characteristically high protein content. Evidence suggests that from this point of view hard, red, spring wheat would be worth at least a trial.—*V. H. Young.*

792. KOFAHL, H. Der gehörnte Schotenklee. [The horned pod clover (*Lotus corniculatus*).] Illus. Landw. Zeitg. 41: 146-147. 1921.—This plant is recommended as a perennial leguminous forage plant in sections of Germany where alfalfa cannot be successfully grown. It grows best on a fertile soil having a clay subsoil and free from weeds, especially couch grass; it should be grown with oats or barley. The first cutting is the most productive. It appears to be long-lived and entirely resistant to winter killing. The best yield of seed is from the 2nd cutting. As forage, it is well liked by both cattle and swine.—*John W. Roberts.*

793. KRESS, OTTO. Cooking cotton hull fiber for pulp. Paper 25: 964-968, 1009-1011. 1920.

794. MAIDEN, J. H. Chats about the prickly pear. No. 8. Agric. Gaz. New South Wales 32: 45-48. 1 fig. 1921.—A discussion of extermination methods is presented. It has been found that cutting just below the surface of the ground, followed by thorough spraying with suitable poisons, generally kills the plant.—*L. R. Waldron.*

795. MAKIN, R. N. Farmers' experiment plots. Potato experiments, 1919-20, Cotta Walla-Crookwell District. Agric. Gaz. New South Wales 32: 7-9. 1921.—Variety trials carried on in cooperation with 3 farmers showed considerable variations in yield. One variety, Factor, yielded best, and Magnum Bonum and Early Manistee are recommended.—*L. R. Waldron.*

796. MALTE, M. O. Breeding methods in forage plants. Sci. Agric. [Canada] 1: 25-29. 1921.—A paper read before the Western Canadian Society of Agronomy and confined to breeding methods of a practical nature applicable to grasses, alfalfa, and red clover in Western Canada. Author found that in western rye grass (*Agropyrum tenerum* Vasey) and in other species of *Agropyrum*, self-fertilization regularly takes place. It is thus possible to work with many forms without the necessity of isolation. With alfalfa imperfect seed formation is due to defective sexual organs and frequently to unsuitable environmental conditions. In the case of red clover mass-selection brings results in a comparatively short time and is of practical importance.—*B. T. Dickson.*

797. NEIDIG, RAY E. Sugar beet top silage. Jour. Agric. Res. 20: 537-542. 1921.—Chemical analyses of average beet top silage, as found on the farm. Careless ensiling may allow abnormal fermentation, with possible production of substances toxic to animals.—*D. Reddick.*

798. OPAZO, ROBERTO. Cultivo y industria del azucar de betarraga. [Cultivation of the sugar beet.] El Agricultor [Santiago, Chile] 5: 120-122. 1920.—Discusses the possibility of a sugar beet industry in Chile.—*John A. Stevenson.*

799. OPAZO, ROBERTO. Cultivo de plantas oleaginosas. [Cultivation of oil plants.] El Agricultor [Santiago, Chile] 5: 195-198. 1920.—Discusses the cultivation of the peanut, sunflower, soybean, sesamum, and poppy as oil plants.—*John A. Stevenson.*

800. OPAZO, ROBERTO. Preparación de terrenos para la siembra de chacras. [Cultivation of small farms.] El Agricultor [Santiago, Chile] 5: 165-166. 1920.—Recommends seed selection of corn, sorghum, and other crops to be grown on small holdings and gives general cultural directions.—*John A. Stevenson.*

801. OPAZO, ROBERTO. Siembras de cebada y de avena. [Seeding barley and oats.] El Agricultor [Santiago, Chile] 5: 147-148. 1920.

802. OPAZO, ROBERTO. Siembras de trigo. [Planting wheat.] El Agricultor [Santiago, Chile] 5: 70-73. 1920.—A general discussion of wheat growing in Chile, including soil types, manner of sowing, fertilizers used, and cultivation methods.—*John A. Stevenson.*

803. PITT, J. M. Farmers' experiment plots. Summer fodder experiments, 1919-20. Central coast. Agric. Gaz. New South Wales 31: 805-808. 1 fig. 1920.—In cooperation with farmers, trials were conducted with Sudan grass, sachaline, Planter's Friend sorghum, and Japanese millet. The maximum yield, 36 tons of green fodder per acre, was secured from sachaline, plants attaining a height of 13 feet. Sudan grass grew 8 feet in 11 weeks.—*L. R. Waldron.*

804. PRIDHAM, J. T. Varieties of wheat tested in New South Wales. Agric. Gaz. New South Wales 32: 10-19. 1921.—A total of 249 varieties of wheat are listed, including 59 duplicates. Notes are given as to season, utilization, character of grain, origin, adaptations, defects, good points, and distinguishing characters.—*L. R. Waldron.*

805. QUEREAU, F. C. The amount of salt in irrigation water injurious to rice. Louisiana Agric. Exp. Sta. Bull. 171. 14 p., 8 fig. 1920.—Irrigation water is liable to contain salt during periods of drought. Pot and field experiments show that water containing 35 grains or more of salt to the gallon is liable to be injurious to rice.—*C. W. Edgerton.*

806. QUEREAU, F. C. Rice investigations. Louisiana Agric. Exp. Sta. Bull. 172. 87 p., 35 fig. 1920.—This bulletin discusses the various investigations that have been carried on with rice in the rice belt of Louisiana. In the fertilizer experiments, the best results were obtained with fertilizers that contained phosphoric acid. Potash does not seem to be necessary.—The rotation experiments showed that short rotations are not profitable, due to the high overhead expense necessitated by the change from rice to highland crops. The rotation recommended is 5-7 years in rice followed by the same period in other crops.—Red rice is one of the most important difficulties of the rice farmer. Methods for controlling red rice include rotation, use of cover crops, and pasturage. Crude oil has been found useful in controlling the root maggot. The principal rice diseases are rotten neck or blast (*Piricularia oryzae*) and straight head. The rotten neck disease occurs both in young and old plants. The straight head is most common on ground that produced a crop other than rice the preceding year. Straight head rarely develops in fields that have been drained during the season.—The best methods of growing, fertilizing, and harvesting rice are given. The estimated cost of growing an acre of rice in 1910 was \$27.26, while in 1917-1918 it was \$31.95.—*C. W. Edgerton.*

807. RINDL, M. Vegetable fats and oils. IV, and V. Semi-drying oils. South African Jour. Indust. 3: 518-531, 742-749. 1920.

808. RÍOS, P. GONZALEZ. La producción de nuevas variedades de caña. [The production of new cane varieties.] Sugar 21: 218-221. 3 fig. 1919.—Discusses the production of sugar cane seed and the growing of sugar cane seedlings.—*C. W. Edgerton.*

809. ROBERTS, HERBERT F. The relation of protein content to variety types in American wheat. Jour. Agric. Sci. 10: 121-134. 1920.—Author reviews and analyzes several papers on the protein content of American wheat and its relation to variety and climate. A short and comparatively dry growing season, especially in spring in the case of winter wheat, favors the development of grain high in protein content. Water supply is the most important factor in determining the starch-protein ratio. Higher rainfall or a greater amount of irrigation water increases the proportion of starch in wheat. The protein content of wheat increases from east to west with the exception of the Pacific Coast region, which in general produces wheat lowest in proteins. There is considerable variation in the starch-protein ratio within definite varieties. Mediterranean durum are highest, Russian durums are next, and bread wheats are lowest in protein content. In given regions the variation in protein content for

different varieties of wheat is from less than 1 per cent to more than 3 per cent. In many regions, the varieties most favored by farmers have been shown to be those varying most in the starch-protein ratio. This is true of Club wheat in California, and, in the order named, of Bluestem, Little Club, Turkey Red, Jones' Winter Fife, and Forty-fold in Washington. Since variation in protein is a varietal characteristic in wheat, author concludes that in breeding for general purposes, wheat strains should be sought which vary in the starch-protein ratio, since this indicates that they have a greater climatic adaptability. In breeding for a limited locality, wheat with a maximum protein content and with the least possible variation with respect thereto is to be sought.—*V. H. Young.*

810. ROSENFELD, ARTHUR H. Problems of cane fertilization. Sugar 21: 24-26, 118-119. 1919.—The results of several years' experiments with various fertilizers on sugar cane are not consistent and consequently none of the fertilizers tried is recommended. Rotation and the use of legumes are advocated.—*C. W. Edgerton.*

811. ROSENFELD, ARTHUR H. Further experiments in fertilizing cane. Sugar 22: 662-664. 1920.—No definite conclusions can be drawn from the various fertilizer experiments which have been conducted at the Tucuman (Argentina) Experiment Station, as the results have not been consistent.—*C. W. Edgerton.*

812. SCHROEDER, H. Die jährliche Gesamtproduction der grünen Pflanzendecke der Erde. [The annual production of the vegetation of the globe.] Naturwissenschaften 7: 8-12, 23-29. 1919.—This is in reality a calculation of the total quantity of CO₂ consumed annually by green plants. The author briefly reviews previous papers and proceeds to consider the land surface of the globe as consisting of forest, agricultural land, steppe, and desert. For each of these divisions various calculations are made based upon available data together with such corrections as the author considers necessary. For instance, he takes Ebermayer's determination that in the Bavarian forests 3000 kgm. of carbon are fixed annually per hectare; taking into account the fact that the vast areas of circumpolar and mountain forests must fix less, although tropical and subtropical forests probably fix more, the author considers that this figure should be reduced by 1/6, and that 2500 kgm. per hectare is nearer a true average. Much space is devoted to a discussion of the principal crop plants, wheat, rye, barley, oats, maize, potatoes, and rice, and the author concludes that these plants fix 1600 kgm. of carbon per hectare annually. This figure includes grain, straw, and the roots and stubble left on the field. Forage crops, such as clovers, sorghums, peas, soybeans, green maize, as well as sugar, are believed to fix on the average about the same amount of carbon as the grains. Steppe and desert vegetation can only be estimated and there is a large margin of possible error. The final figures are given in table 15 (p. 27). To these he adds an estimate of the carbon fixed by the benthos, and arrives at 60 billion kgm., with limits of 50 and 80 billions, as the quantity of CO₂ annually consumed by green plants. Of these 60 billions, 40 are consumed by forest, 14 by agricultural, 4 by steppe, and 1 by desert plants. The author also discusses briefly the return of CO₂ to the air by decay and other means, but concludes that the quantitative data are too scanty to warrant even a guess. The total CO₂ of the atmosphere being 2100 billion kgm., it follows that unless replaced the available supply would be exhausted in about 30 years.—*A. J. Pieters.*

813. SHEPHERD, A. N. The Tick bean. (*Vicia faba*.) A green manure crop for irrigation areas. Agric. Gaz. New South Wales 32: 42-44. 2 fig. 1921.—Tick beans were grown on a plot in the Murrumbidgee irrigation area with good results. In consequence of several irrigations, over 15.5 tons of green crop—easily turned under—were produced per acre. It was calculated the crop returned to the land 145 pounds of nitrogen (as ammonia) per acre.—*L. R. Waldron.*

814. SMEDING, S. Ervaringen omtrent de cultuur op de in 1916 overstroomde gronden in de Anna Paulawnapolder. [Experiences on crop growing in the 1916 inundated lands of the Anna Paulawnapolder.] Cultura 32: 1-29, 60-64. 1920.—In 1916 some low lands in the prov-

ince of North Holland, Netherlands, were inundated by sea water. At first many farm crops could not be grown. The soil had to be cultivated thoroughly to prevent excessive evaporation due to capillary action, which would result in an increase of salt content toward the soil surface. Proper drainage by pumping machines was advised. Heavy soils rather than lighter ones were sensitive to deep plowing. Deep fall plowing on inundated lands is not advisable. Spring treatment of the soil must be superficial, and only the cultivator and harrow should be used to prepare the seed bed.—The first year sugar beets and mangel-wurzels proved resistant to salty soil; spring barley also succeeded; mustard did fairly well; alfalfa prospered only on lighter soils; red clover was everywhere poor. The growing of oats, peas, spinach, potatoes, and cabbage was impossible.—The second year, 1917, the soil contained less salt, though its structure was not normal. However, the early summer was dry and a good harvest was obtained from sugar beets, mangel-wurzel, spinach, radish, and spring barley; on lighter soils spring barley, mustard, red clover, and alfalfa did well; wheat, oats, and flax were fairly good; white and brown beans were a failure.—The third year, 1918, the salt had diminished to such an extent that it no longer affected field crops though the structure of the heavy soils still remained abnormal. On lighter soils good harvests of spinach, radish, oats, spring barley, cabbage, broad beans, and peas were obtained. On heavy soils most crops, including beets, were not as good as in the previous year.—*J. C. Th. Uphof.*

815. SOUTHWORTH, W. A study of the influence of the root system in promoting hardiness in alfalfa. *Sci. Agric. [Canada]* 1: 5-9. 1921.—A paper read before the Western Canadian Society of Agronomy dealing with experiments carried on at the Ontario and Manitoba Agricultural Colleges. Plants possessing a branched root system are better able to withstand winter heaving than those having only a single taproot. Plants which develop rooting underground stems are able to maintain themselves after the death of the main rootstock. When alfalfa has the habit of spreading by root proliferation, the plant is better able to recuperate from injury and to withstand cold. Such plants are usually less nutritious and palatable and work is in progress at the latter institution to remedy these defects.—*B. T. Dickson.*

816. STAPLEDON, R. G. Seed studies: red clover with special reference to the country of origin of the seed. *Jour. Agric. Sci.* 10: 90-120. 1920.—The country of origin of seeds of various cultivated plants is important in determining the value of the crop for various purposes. In England, clover seed from various sources varies greatly in the yield produced and the value of the crop. Home-grown seed appears to be best for most uses. To a certain extent the type of weed seeds found in clover is valuable in determining its source, but the source of cleaned and blended seed can hardly be determined in this way. Author has worked out a system of classification of seeds of red clover based on germinating power, average size, and proportion of different colored seeds. Seeds were classed according to color as yellow, violet, and brown, and the various color variations, mottlings, etc., included with each color are described. The proportion of "hard" seed was also determined. The results of an exhaustive study of seed from two seasons' crops has enabled the author to give definite criteria for the determination of the country of origin of clover seed and also has shown that there is a definite coordination between the physical characteristics of clover seed and its value for a definite purpose.—*V. H. Young.*

817. STENT, SYDNEY M. Kudzu (*Pueraria thunbergiana*). [Rev. of: PIPER, C. V. *Kudzu*. U. S. Dept. Agric. Dept. Circ. 89. 7 p. 1920 (see Bot. Absts. 6, Entry 1428).] *Jour. Dept. Agric. Union of South Africa* 1: 558-560. 1920.—Brief comment on adaptability and source of seed.—*E. M. Doidge.*

818. STIETZ, G. E. G. Sugar cane culture in Java. *Louisiana Planter and Sugar Manufacturer* 65: 219. 1920.

819. TAGGART, W. G. Louisiana seedling canes. *Sugar* 21: 426-429, 439. 1919.—The Louisiana Experiment Station has been growing seedling canes for a number of years. The seed was obtained from various tropical countries. Cane seed usually germinates very

poorly and generally only a few plants are obtained from a shipment of seed. Of the several hundred seedlings which have been grown, only a very few show particular merit. The most valuable seem to be the L 253 and L 511. The L 253 seedling produces a very heavy tonnage but the sugar content is no better than that of the native canes. The L 511 seedling is a cane richer in sucrose than any of the canes ordinarily grown in Louisiana.—*C. W. Edgerton.*

820. TAGUE, E. L. Changes taking place in the tempering of wheat. *Jour. Agric. Res.* 20: 271-275. 1920 [1921].—Improvement in the milling quality of wheat is effected by moistening the grain. Hard wheats are improved more than soft ones and dry wheats are improved more than wet ones. Improved milling quality of tempered wheat is due chiefly to physical changes. The optimum conditions are: Temperature 20 to 25°C., time 48 hours, moisture 15.5 per cent.—*D. Reddick.*

821. WEST, CLARENCE J. Paper from bagasse. Paper 26: 62-64. 1920.—A description of the method used in making paper pulp from sugar cane refuse.—*H. N. Lee.*

822. WEST, CLARENCE J. Possibilities of African grasses in paper manufacture. Paper 26¹⁶: 10. 1920.—A condensed analysis of African grasses, summarizing their possibilities in the manufacture of paper.—*H. N. Lee.*

823. ZAYAS, M. Cultivo de las judías. [Bean cultivation.] *Informacion Agric.* [Madrid] 10: 526-528. 2 fig. 1920.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 781, 954, 1935, 1169, 1288, 1536, 1539, 1544)

824. ANONYMOUS. Canadian Branch of the American Phytopathological Society. *Sci. Agric.* 1: 18. 1921.—An account of the second annual meeting of the above branch held in the Biological Building at the Ontario Agricultural College on Dec. 9 and 10, 1920.—*B. T. Dickson.*

825. ANONYMOUS. Édouard Prillieux. *Ann. Service Épiphyties* 4: 1-16. *Portrait.* 1917 [1919].—Édouard Ernest Prillieux, "the founder of phytopathology in France," was born in Paris, Jan. 11, 1829, and died Oct. 6, 1915, at Mondoubleau (Loir-et-Cher). He was educated at the old Institut National Agronomique (1848-1853), and immediately devoted himself to the problems of vegetable pathology, particularly diseases of the vine. In 1887 he founded the Station de Pathologie Végétale at Paris, and in 1894 furthered the establishment of the Station Entomologique. A portion of the article is given to analysis of Prillieux' scientific researches, and there follows a classified list of his publications, 184 in number.—*M. F. Warner.*

826. ANONYMOUS. Die Forste und der Friedensvertrag. [Forests and the peace treaty.] *Allg. Forst- u. Jagdzeitg.* 38: 70. 1920.—Hungary loses over half of her coniferous forest to Roumania, 36 per cent to Czecho-Slovakia, and 11 per cent to Jugo-Slavia. The situation is similar in respect to beech and oak, so that the once well forested Hungary is reduced to a wood importing country.—*F. S. Baker.*

827. BARNHART, J. H. Brackenridge and his book on ferns. *Jour. New York Bot. Gard.* 20: 117-124. 1919.—This sketch of William D. Brackenridge (1810-1893) deals particularly with his part in the Wilkes Exploring Expedition and with the preparation of his work on ferns.—*Neil E. Stevens.*

828. BARNHART, J. H. Historical sketch of the Torrey Botanical Club. *Mém. Torrey Bot. Club* 17: 12-21. 1918.—This sketch deals especially with the formation and work of the

society and is followed by reminiscences of the early days and former members by, H. M. DENSLOW (p. 22-23), N. L. BRITTON (p. 24-28), and ARTHUR HOLLICK (p. 29-30).—*Neil E. Stevens.*

829. BARNHART, J. H. Some fictitious botanists. *Jour. New York Bot. Gard.* 20: 171-181. 1919.—Fourteen so-called "botanists" from Appleton's *Cyclopedia of American Biography* are listed, and evidence is presented to show that their supposed biographical accounts are fictitious.—*Neil E. Stevens.*

830. BATESON, W[ILLIAM]. The late Mr. R. P. Gregory. *Nature* 102: 284. 1918.—See *Bot. Absts.* 5, Entry 1234.

831. BOIS, DÉSIRÉ. Notice sur M. Maurice Lévêque de Vilmorin. *Bull. Soc. Bot. France* 66: 140-143. 1919.—Auguste-Louis-Maurice Lévêque de Vilmorin (1849-1918) was especially interested in forest botany and the study of fruit and ornamental trees. A list of 20 of his publications is given.—*B. O. Dodge.*

832. BOULGER, G. S., AND JAMES BRITTEN. Joseph Andrews and his herbarium. *Jour. Botany* 56: 257-261. 1918.—The British Museum (Natural History) contains a collection of plants formed at Sudbury by the apothecary Joseph Andrews, between 1710 and 1757. Andrews was a friend of Dale, and probably the man appointed in 1707 as inspector of the Chelsea Garden, together with Wyche and Petiver. He is mentioned in Dillenius' edition of Ray's *Synopsis Methodica Plantarum Britannicarum*, ed. 3, 1724, though it is not certain that Dillenius was acquainted with Andrews, whose specimens are numbered in accordance with the 2d ed. of Ray's *Synopsis*, but Andrews owned a copy of the Dillenian edition, afterwards owned by the late W. A. Clarke, which contains a few marginal notes and references to other authors.—*M. F. Warner.*

833. B[OWER], F. O. Prof. William Gilson Farlow. *Nature* 103: 509. 1919.—See also *Bot. Absts.* 6, Entries 916, 947, 956, 963, 1463, 1470.

834. BRIQUET, JOHN. Notice sur la vie et les travaux botaniques de Louis Naville (1843-1916). *Ann. Conservatoire et Jard. Bot. Genève* 20: 215-221. *Portrait.* 1919.—Constant-Louis Naville of Geneva was a man of letters whose avocations were botany and mountain climbing. He made numerous explorations throughout the Swiss Alps, Savoy, and Dauphiny, collecting an herbarium of 3001 numbers, which he gave to the Conservatoire Botanique of Geneva. He published nothing save a popular article, "La flore du Salève," in 1885.—*M. F. Warner.*

835. BUNYARD, E. A. Cotton's "Planter's Manual." *Gard. Chron.* III, 63: 174-175. 1918.—Published in 1675, by Charles Cotton, known as a poet and for his association with Walton's Compleat Angler. Although from the preface it would appear that the book is by Cotton himself, it is actually a translation from the "Instructions pour les arbres fruitiers" first published 1653, by "M. R. T. P. D. S. M.," i.e., M. Robert Triquet, prieur de St. Marc, who in turn was only editor, as the preface states that the book was written by François Vautier, physician to Louis XIV.—*M. F. Warner.*

836. BUNYARD, E. A. Henry van Oosten and the "Dutch gardener." *Jour. Pomology* 1: 37-40. 1919.—For its pomological sources the "Dutch gardener" goes back to LA QUINTINYE, "Instructions pour les jardins potagers et fruitiers," pirated edition by DESBORDES, Amsterdam, 1699, which contains "L'Art de tailler les arbres fruitiers," condensed from VENETTE's book of the same title (1683). Mentions English translation of Venette (1685), and hints that it may have been by EVELYN, as certain phrases have "his unmistakeable ring about them." Mr. Bunyard does not give the earliest Dutch edition of van Oosten, but mentions the English ones of 1703 and 1711, the German of 1706 under title: "Niederlandischer blumen obst und orangeriegarten," the French under title: "Le jardin d' Hollande." He finds that van Oosten borrowed the material on oranges directly from La Quintinye himself.—*M. F. Warner.*

837. BUNYARD, E. A. The history of cultivated fruits, as told in the lives of great pomologists. Robert Thompson. Gard. Chron. III, 63: 121-122. *Portrait*. 1918.—“His work as a pomologist, especially in the rectification of nomenclature, places him in the first rank.” The present article deals with his work on the Catalogue of fruits cultivated in the Garden of the Horticultural Society of London, in the Pomological Magazine, Loudon's Encyclopaedia of gardening (new ed., 1835), in the Transactions of the Horticultural Society, and especially emphasizes the value of his “Gardener's assistant,” first published in 1859. Few details of his life are given, save the record from Thompson's own hand in the book at Chiswick, on his admission there Oct. 21, 1824, in which he states that he was born in the parish of Echt, in the County of Aberdeenshire, in the year 1799, and not 1798, which is commonly accepted as the date of his birth. He died in 1869. To this article is appended a letter from BRIAN WYNNE, giving some recollections of Thompson in his later years.—*M. F. Warner*.

838. BUNYARD, E. A. Some old English apples. Gard. Chron. III, 63: 219-220. 1918.—Keddleston Pippin, known in 1830, and in high favor in 1833; Gennet Moyle, still grown in Cornwall, dating back to Evelyn's day, and celebrated by Philipps in his poem on cider. The word Gennet is probably derived from the French Jeannette, and as our Juneating or Jenneting is probably from Gennet, the apple should therefore be spelled Genneting or Jenneting. The Old Pearmain, not identical with apple of same name in KNIGHT's “*Pomona Herefordiensis*,” Orange Pippin also differs from that figured by HOGG and BULL in the “*Herefordshire Pomona*.”—*M. F. Warner*.

839. CARDOT, JULES. [Letter to E. B. Chamberlain.] *Torreyia* 19: 33. 1919.—Portion of a letter describing the devastation of his herbarium and library at Charleville, France, by the German invaders.—*Neil E. Stevens*

840. CARPENTIER, A. L'abbé Félix-Charles Hy (1853-1918). *Rev. Gén. Bot.* 30: 369-376. 1918.—Brief account of the life and work of M. Hy, for 40 years professor of botany at the Université Catholique of Angers. A chronological list of his publications is appended, 64 in number.—*Neil E. Stevens*.

841. CARQUEJA, BENTO. Barão de Soutelinho. *Broteria Ser. Bot.* 16: 25-28. *Portrait*. 1918.—ALFRED TAIT, Baron de Soutelinho, died March 16, 1917. He introduced many useful plants into Portugal. Was primarily a floriculturist, specializing on narcissus, chrysanthemums, and cactus dahlias. Rediscovered *Narcissus cyclamineus* in Portugal near Porto.—*M. F. Warner*.

842. CHODAT, ROBERT. Richard-Emile-Augustin de Candolle. *Arch. Sci. Phys. et Nat.* 2: 169-175. 1920.—Augustin de Candolle (1868-1920) was the fourth of a distinguished line of botanists, being preceded by his father, CASIMIR DE CANDOLLE, his grandfather, ALPHONSE DE CANDOLLE, and his great-grandfather, AUG.-PYR. DE CANDOLLE. The contributions of Augustin de Candolle to botanical science include physiology, morphology, and taxonomy. This account of his life by Professor Chodat is followed by a complete list of publications.—*J. H. Faull*.

843. CHURCH, A. H. Bibliographical notes, LXXIV. Baxter's ‘British phaenogamous botany.’ *Jour. Botany* 57: 58-63. 1919.—Issued in monthly parts of 4 plates and text, from Sept. 1832 to Mar. 1843, this issue being regarded as the first edition, and complete sets are inscribed second edition only on the title of the first volume. The reprint in 1856 was in no sense a third edition. The differences in title of the monthly parts and complete volumes are given, with dates and inclusive plate numbers for each of the 6 volumes. Author comments on the merits of the plates, and gives an estimate of the value of Baxter's work.—*M. F. Warner*.

844. COBB, RUTH. Periodical bibliographies and abstracts for the scientific and technological journals of the world. *Bull. Nation. Res. Council* 1: 131-154. 1920.—A partial list of serials regularly containing bibliographies or abstracts in various fields of science, each

title being given as a rule under all the subjects covered by it. Most of those relating to bibliography of Pathology are listed under Botany, but others of interest are given only under Bacteriology. The topics Agriculture and Forestry and Medical Sciences also include matter of interest to the botanist, but no place is provided for general biology or genetics.—*M. F. Warner.*

845. DELAUNAY, PAUL. *Un botaniste manceau, Hector Lèveillé (1863–1918)*. Bull. Géog. Bot. 27: 57–96. 1919.—An enthusiastic account, with bibliography, of the varied activities of l'abbé Leveillé not only in the field of botany, but in the organization of learned societies, and the study of anthropology, geography, history, biography, and archeology. As a botanist he was best known for his studies of regional floras.—*Neil E. Stevens.*

846. [DUDGEON, WINFIELD.] *The Indian Botanical Society*. 12 p. Allahabad, 1920.—This society "for uniting the botanists and promoting the botanical interests of India" was organized in 1920. The history of its organization together with the provisional constitution and list of charter members is here printed.—*Neil E. Stevens.*

847. DURHAM, H. E. *Philological notes*. Gard. Chron. III, 64: 146–147. 1918.—Origin and associations of the following: "Bloom," corresponding to the French "fleur," whence possibly some of the apples known as Belle Fleur; "pruine" from prune; the Pearmain or Parmayns, for which numerous derivations have been suggested, to which the author adds the possibility that the name may have come from the French "permaindre" or "parmaindre" (Latin "permanere"), because of the lasting quality of the fruits originally so called.—*M. F. Warner.*

848. DYKES, W. B. *Did the tulip mania ever reach Italy?* Garden 83: 528. 1919.—In response to an inquiry author says that Mattei in his article "I tulipani di Bologna," *Malpighia*, 1893, p. 15, states as a matter of course that when the mania was at its height in Holland in 1634 there were "maniacs" also in Florence, Bologna, and elsewhere.—*M. F. Warner.*

849. FAIRBRIDGE, DOROTHEA. *Vergelegen*. South African Gard. 9: 408–409. *Illus.* 1919.—An estate at Cape of Good Hope granted in 1700 to Governor WILLEM ADRIAAN VAN DER STEL, who cultivated here at the beginning of the 18th century a great variety of European vegetables, also interesting himself in food possibilities of the native plants. He grew tulips and Ceylon bulbs, and both he and his father, SIMON VAN DER STEL, sent quantities of Cape bulbs to Holland. He introduced the white mulberry into cultivation at the Cape. His manuscript on gardening, now in the South African Public Library, which was published in 1825 in the African Court calendar as an issue of the "African gardeners' and agriculturists' calendar," contains mention of diseases of fruit trees.—*M. F. Warner.*

850. FAIRCHILD, DAVID. *Byron David Halsted, botanist (1852–1918)*. Phytopath. 9: 1–6. *Portrait.* 1919.—An intimate and interesting personal sketch of Dr. Halsted and his methods of work, by his nephew.—*Neil E. Stevens.*

851. FARQUHARSON, C. O. *Charles Ogilvie Farquharson and his work in West Africa*. Kew Bull. Misc. Inform. 1918: 353–361. 1918.—Letter to the Assistant Director at Kew, with prefatory note stating that Farquharson died Oct. 3, 1918. "A remarkably graphic epitome of his life work in Nigeria. The nature of the work, the methods by which he sought to solve the many difficult problems, and the kind of education that his experience had led him to believe best for such work are all fully discussed."—*M. F. Warner.*

852. FLETCHER, S. W. *One hundred years of strawberry growing in North America*. Proc. Amer. Pomol. Soc. 35: 125–132. 1918.—Commercial history. Although native berries abounded, and plants were brought from the fields and cultivated by the colonists as early as 1700, there was no attempt to grow for the market until after 1800.—*M. F. Warner.*

853. FOX, R. H. *Dr. John Fothergill and his friends (chapters in eighteenth century life)*. xxiv + 434 p., *frontispiece, plates, portraits*. Macmillan & Co., Ltd.: London, 1919.—See Bot. Absts. 6, Entry 911.

854. GEDDES, PATRICK. *The life and work of Sir Jagadis C. Bose*. xii + 259 p., *frontispiece, illus., pl., portrait*. Longmans, Green & Co.: London, New York, 1920.—The education of Dr. Bose (born 1858) and his researches on the irritability of plants and related subjects are discussed. The two concluding chapters are devoted to a description of the Bose Institute, and to the address delivered by Dr. Bose at its dedication. [See Bot. Absts. 8, Entry 58.]—*Neil E. Stevens*.

855. GIRARD, A. C. *Achille Müntz, 1846–1917*. Ann. Inst. Nation. Agron. II, 13: 171–217. *Portrait*. 1918.—Charles-Achille Muntz was connected with the Institut National Agronomique at Paris from 1876 to the close of his life. He was primarily an agricultural chemist, but among his nearly 300 publications listed on p. 206–217 are many on crop plants and physiology.—*Neil E. Stevens*.

856. GRAVES, F. M. *On the walled garden*. Gard. Chron. III, 65: 105–106. 1919.—Translated from “Le Menagier de Paris,” written between June 1392 and September 1394, and published by the Société des Bibliophiles Français in 1846. The present portion, translated from the section on “Courtillage,” deals with the cultivation of vegetables, flowers, and herbs, indicating the extensive number of plants then cultivated, with brief suggestions on grafting.—*M. F. Warner*.

857. GRINDLEY, F. H. *The history, progress and future of the C. S. T. A. Sci. Agric.* 1: 10–12. 1921.—An account by the General Secretary-Treasurer of the formation of the Canadian Society of Technical Agriculturists. The Society aims at raising the status of scientific agriculture in Canada and, by means of its official organ “Scientific Agriculture,” giving publicity to experimentation and research carried on not only in Canada, but elsewhere when applicable to Canadian conditions.—*B. T. Dickson*.

858. G[ROVE], W. B. *James Eustace Bagnall, A. L. S. (1830–1918)*. Jour. Botany 56: 354–356. 1918.—His active life spent in business in Birmingham, his recreations were the study of the local flora and of mosses. Wrote: “Handbook of mosses” (1886); “The Flora of Warwickshire” (1891); “The Flora of Staffordshire” (1901), and numerous articles in journals.—*M. F. Warner*.

859. GÜSSOW, H. T. *Establishment of an Imperial (British) bureau of mycology*. Phytopath. 9: 265. 1919.

860. HABERLANDT, GOTTLIEB. *Grabrede auf Simon Schwendener am 2 Juni 1919*. [Funeral oration for Simon Schwendener.] Naturwiss. Wochenschr. N. F., 18: 417. 1919.

861. HEDRICK, U. P. *Edward Lewis Sturtevant*. Rept. New York Agric. Exp. Sta. [Geneva] 1919²: 1–16. *Portrait*. 1919 [1920]. Published as 27th Ann. Rept. New York State Dept. Agric. Vol. 2, part 2.—“Edward Lewis Sturtevant, farmer, botanist, physician, and author was one of the giants of his time in the science of agriculture.” Born, Jan. 23, 1842, died, Jan. 19, 1879. Educated at Bowdoin and Harvard Medical School. Conducted systematic experiments privately 1875–1880. Director New York State Agricultural Experiment Station 1882–1887. A bibliography of 89 titles covering his principal scientific writings is appended.—*D. Reddick*.

862. HEDRICK, U. P., Editor. *Sturtevant's notes on edible plants*. Rept. New York Agric. Exp. Sta. [Geneva] 1919²: 17–686. 1919 [1920]. Published as 27th Ann. Rept. New York State Dept. Agric. Vol. 2, part 2.—Materials selected from following sources: An extensive manuscript owned by the New York Experiment Station, a mass of index cards located there and at the Missouri Botanical Garden, and Sturtevant's published work on the history

of esculents in the Station reports and American Naturalist. The researches into the origin and development of cultivated plants have been combined with hundreds of notes on local and aboriginal uses as food, and arranged in a single alphabet under specific names of plants, with bibliographical citations reduced to footnotes and a list of "Authors and titles quoted in Sturtevant's notes on edible plants" appended (p. 625-667). Separate indexes to botanical synonyms and vernacular names.—*D. Reddick.*

863. HENRIQUES, J. A. J. F. *Correa da Serra*. *Broteria Ser. Bot.* 16: 104-112. 1918.—José Francisco Correa da Serra was born at Serpa June 6, 1750, and died in 1823. Although an ecclesiastic, he held several diplomatic positions, among them that of Minister of Portugal to the United States. As naturalist he was especially interested in geology and botany, publishing papers in the latter subject in *Ann. Mus. Hist. Nat. Paris*, *Phil. Trans. Roy. Soc. London*, *Trans. Amer. Phil. Soc.*, and other journals.—*M. F. Warner.*

864. HENRY, AUGUSTINE. *The cedars of Lebanon. References to the trees of great age that form the nucleus of the historic grove.* *Sci. Amer. Suppl.* 87: 295. 1919. (From *Country Life* [London].)—The grove of cedars near Bsherreh has been celebrated for centuries, and many travellers have counted its principal trees, which have gradually decreased in number. BELON visited Mount Lebanon in 1550 and counted 28 great trees, while Sir JOSEPH HOOKER in 1860 found 15 which he judged to be the remainder of these. Both Hooker and GADEAU DE KERVILLE, who was there in 1908, measured some of the great trees, the former estimating that the largest might be 2500 years old. But from a specimen in the Kew museum showing 235 annual rings, Hooker's 2 largest trees, with a girth of 13 feet, would be about 2330 years old.—*M. F. Warner.*

865. JACOB, JOSEPH. "Pritzel." "A florist's plea to the powers that be." *Garden* 83: 118-119. 1919.—In regard to extending the scope of the new edition of the "Iconum botanicarum index" which has been undertaken by the Royal Horticultural Society.—*Neil E. Stevens.*

866. JACOB, JOSEPH. *The wheat-ear carnation.* *Garden* 83: 300-201. 1. fig. 1919.—Apropos of a paper on this subject in the *Carnation Year Book* for 1919, author goes back to CASTELLI's "Exactissima descriptio rariorum quarundam plantarum, quae continentur Romae in Horto Farnesiano" (1625), and reproduces the drawing of "Caryophyllus spicatus" from the 11th chapter. He also cites LINNE, "Hortus Cliffortianus" (1737); WEINMANN, "Phytanthozaiconographia" (1739); and *Bot. Mag.* (1814), plate 1622, for illustrations of the same phenomenon.—*M. F. Warner.*

867. JENNINGS, O. E. John Adolph Shafer. *Trillia* 5: 3-7. 1919.—Born 1863, died 1918.—*M. F. Warner.*

868. JUEL, H. O. *Hortus Linnaeanus. An enumeration of the plants cultivated in the Botanical garden of Upsala during the Linnean period.* *Skrifter Svenska Linné Sällsk.* 1: 1-127. 1919.—Linnaeus was in charge of the garden at Upsala from 1742 until at least 1776, when his son may have taken over its care. The present list of 2157 species is compiled from books and papers of father and son, the titles of which are given in chronological order on p. 6-8.—*M. F. Warner.*

869. KELLY, H. A., AND W. L. BURRAGE. *American medical biographies.* xix + 1320 p. Norman, Remington Co.: Baltimore, 1920.—In selecting the more than 1900 names here included the principle of the editors has been "to include every man who has in any way contributed to the advancement of medicine in the United States or in Canada, or who, being a physician, has become illustrious in some other field of general science or in literature." This policy together with the senior editor's special interest in botany and medical botanists makes this a valuable reference book for botanical biography. Biographical sketches are given of the botanists listed below. In some cases this is the only readily available biography of the subject, many of the sketches contain new material, and all are prepared by competent

authors. Numerous citations of literature are given. Timothy Field Allen (1837-1902), Benjamin Smith Barton (1766-1815), William Paul Crillon Barton (1786-1856), John Bartram (1699-1777), Lewis Caleb Beck (1798-1853), Jacob Bigelow (1787-1879), John Shaw Billings (1838-1913), Reed Brockway Bontecou (1824-1907), Charles Miller Booth (1830-1906), John Brickell (1710?-1745), John Brickell (1749-1809), Robert Bridges (1806-1882), Joseph Carson (1808-1876), Jonathan Carver (1710-1780), Alvan Wentworth Chapman (1809-1899), John Clayton (1693-1773), Cadwalader Colden (1688-1776), Alva Curtis (1797-1881), William Darlington (1782-1863), Chester Dewey (1784-1867), Solomon Drowne (1753-1834), John Eberle (1787-1838), James Eighty (1798-1882), Jared Eliot (1685-1763), Gouverneur Emerson (1795-1874), George Engelmann (1809-1884), Abram Paschal Garber (1838-1881), Alexander Garden (1728-1791), Jean Francois Gaultier (1708-1756), Lewis Reeve Gibbes (1810-1894), William Peters Gibbons (1812-1897), Asa Gray (1810-1888), Jacob Green (1790-1841), Traill Green (1813-1897), Robert Eglesfeld Griffith (1798-1850), Seth Hastings (1780-1861), Louis Hebert (died 1627), William S. Herbst (1833-1906), Constantine Hering (1800-1880), John Philip Hiester (1803-1854), Thomas Horsfield (1773-1859), David Hosack (1769-1835), Benjamin Franklin Hough (1822-1885), Elliot C. Howe (1828-1899), John Gibbons Hunt (1826-1893), Eli Ives (1779-1861), Laurence Johnson (1845-1893), Albert Kellogg (1813-1887), Peter D. Knieskern (1798-1871), Adam Kuhn (1741-1817), John Locke (1792-1856), Moses Marshall (1758-1813), James Mease (1771-1846), Joseph Hinson Mellichamp (1829-1903), Ezra Michener (1794-1887), John Mitchell (1680?-1768), Samuel Latham Mitchill (1764-1831), Isaac Shoemaker Moyer (1838-1898), John Strong Newberry (1822-1892), Charles Christopher Parry (1823-1890), William Dandridge Peck (1763-1822), David Lewis Phares (1817-1892), Charles Pickering (1805-1878), Richard Upton Piper (1816-1897), Zina Pitcher (1797-1872), Francis Peyre Porcher (1825-1895), Alyre Raffeneau-Delile (1778-1850), Isaac Rand (1743-1822), George Abraham Rex (1845-1895), John Leonard Riddell (1807-1867), James Watson Robbins (1801-1879), James Henry Salisbury (1823-1905), Michel S. Sarrazin (1659-1734), Henry Parker Sartwell (1792-1867), John Linnaeus Edward Whitridge Shecut (1770-1836), Charles Wilkins Short (1794-1863), George Smith (1804-1882), Peter Smith (1753-1816), Thomas Taylor (1820-1910), James Thacher (1754-1844), A. S. Todd (1798-1883), John Torrey (1796-1873), William Tully (1785-1859), George Vasey (1822-1893), Benjamin Vaughan (1751-1835), John Aston Warder (1813-1833), Charles Abiathar White (1826-1910), Frederick Adolphus Wislizenus (1810-1889), Christopher Witt (1675-1765), Thomas Fanning Wood (1841-1892), William Zollickoffer (1793-1853).—*Neil E. Stevens.*

870. KILLERMANN, S[EBASTIAN]. *Die Herkunft und Einführung unserer Gartenbohne (Phaseolus vulgaris L.).* [The origin and introduction of our garden bean.] *Naturwiss. Wochenschr. N. F.*, 18: 305-312. *Fig. 1-2.* 1919.—An introduction from America, which took an important place in European gardens early in the 16th century. Early literature is cited and discussed.—*B. O. Dodge.*

871. KILLERMANN, S[EBASTIAN]. *Die Herkunft des Kalmus (Acorus calamus L.).* [The origin of sweet flag.] *Naturwiss. Wochenschr. N. F.*, 18: 633-637. *1 fig.* 1919.—Citations and discussion of early references to this plant.—*B. O. Dodge.*

872. KILLERMANN, S[EBASTIAN]. *Zur Geschichte der Ananas und Agave.* [On the history of the pine-apple and agave.] *Naturwiss. Wochenschr. N. F.*, 17: 497-503. *Fig. 1-3.* 1918.—Citations and discussion of early literature on these plants.—*B. O. Dodge.*

873. KILLERMANN, S[EBASTIAN]. *Zur Geschichte der Johannis- und Stachelbeere.* [On the history of the currant and gooseberry.] *Naturwiss. Wochenschr. N. F.*, 18: 344-347. *Fig. 1-2.* 1919.—Records of the currant are found as far back as the fifteenth century, and of the gooseberry as far back as the sixteenth century.—*B. O. Dodge.*

874. KILLERMANN, S[EBASTIAN]. *Zur Geschichte der Kakteen.* [On the history of cacti.] *Naturwiss. Wochenschr. N. F.*, 18: 665-668. 1919.—Numerous early references to cacti are cited and discussed.—*B. O. Dodge.*

875. KRZYMOWSKI, RICHARD. *Die agrarhistorischen Theorien Eduard Hahns*. [The agricultural history theories of Eduard Hahn.] *Landw. Jahrb.* 53: 485-499. 1919.—The Hahn theory of the development of agriculture is based on the supposition that the early humans were vegetarians or vegetable collectors and that they divided into hunters and fishermen. The choppers, or woodsmen, came from both the fisherfolk and the vegetable collectors, and from the woodsmen developed the horticulturists and agriculturists. The latest group in this development was the herdsmen, or flock masters, who developed from the agriculturists. The theory is opposed to the common conception that the first peoples were hunters and fishermen, then nomads, and finally agriculturists.—*Lyman Carrier*.

876. LAUFER, BERTHOLD. *Sino-Iranica*; Chinese contributions to the history of civilization in ancient Iran, with special reference to the history of cultivated plants and products. *Field Mus. Nat. Hist. Publ. Anthropol. Ser.* 15: iv + 185-630. 1919.—The following are traced in their migration from Persia to China (Sino-Iranica), or from China to Persia (Irano-Sinica): Alfalfa, grape-vine, pistachio, walnut, pomegranate, sesame and flax, coriander, cucumber, chive, onion and shallot, garden pea and broad bean, saffron and turmeric, safflower, jasmine, henna, balsam-poplar, manna, asafoetida, galbanum, oak-galls, indigo, rice, pepper, sugar, myrobalan, the "gold-peach," fu-tse, Brassica, cummin, date-palm, spinach, sugar beet and lettuce, Ricinus, almond, fig, olive, cassia pods and carob, narcissus, balm of Gilead, water-melon, fenugreek, nux-vomica, carrot, aromatics, Malayan Po-se and its products.—*E. H. Groff*.

877. LECOMTE, HENRI. Édouard Bureau. *Rev. Gén. Sci.* 30: 97-98. 1919.—Professor Bureau (1830-1918) succeeded Tulasne as assistant to Brongniart at the Museum of Natural History (Paris), and was afterward professor of systematic botany in that institution for over 30 years. In addition to his studies on the morphology and taxonomy of flowering plants he was much interested in fossil botany.—*Neil E. Stevens*.

878. LIPMAN, J. G. Byron David Halsted. *Proc. Amer. Soc. Hort. Sci.* 15: 117. 1919. (From the "Voorhees farmer," October, 1918.)

879. LORTEL, J. *La transformation des jardins par la Convention en l'An II*. [Transformation of gardens by the Convention in 1794.] *Rev. Hort.* 90: 109-110. 1 fig. 1918.—Efforts to stimulate food production in war time recall a similar attempt in 1794 to popularize vegetable growing. It was the original intention to use portions of the gardens of the Tuileries and Luxembourg, the Paris Museum of Natural History, and other places, for potato growing only, but the scope of the plan was broadened to include turnips, beets, pumpkins, and the Jerusalem artichoke.—*M. F. Warner*.

880. LOYER, MAURICE. Paul Chappellier (1822-1919). *Bull. Soc. Nation. Acclimat. France* 66: 329-330. *Portrait*. 1919.—Obituary notice. Chappellier experimented on improvement of food plants, notably the Chinese yam and *Stachys affinis*.—*Neil E. Stevens*.

881. MAIDEN, J. H. A contribution to a history of the Royal Society of New South Wales, (with information in regard to other New South Wales societies). *Jour. and Proc. Roy. Soc. New South Wales* 52: 215-361. 1918.—Details in regard to the following: Philosophical Society of Australasia (Dec. 1821-1822?), Agricultural Society of New South Wales (July 5, 1822-Feb. 22, 1826), Agricultural and Horticultural Society of New South Wales (Feb. 22, 1816-1836), Australian Society to Promote the Growth and Consumption of Colonial Produce and Manufactures (1830-1836), Australian Floral and Horticultural Society (1836-1848), Australasian Botanic and Horticultural Society (June 20, 1848-Dec. 8, 1856), Horticultural Improvement Society of New South Wales (Jan. 15, 1855-Dec. 8, 1856), Australian Horticultural and Agricultural Society (Dec. 8, 1856), Australian Philosophical Society (Jan. 19, 1850-July 30, 1855), Philosophical Society of New South Wales (July 30, 1855-Dec. 12, 1866), Royal Society of New South Wales (Dec. 12, 1866 to date). A summary of their proceedings is given, with titles of papers read.—*M. F. Warner*.

SS2. MARZELL, HEINRICH. *Zur Kulturgeschichte des Schellkrautes*. [On the history of the culture of celandine.] *Naturwiss. Wochenschr. N. F.*, 18: 601-604. 1919.—The medical uses of *Chelidonium majus* L. in the past are reviewed and early literature is cited.—*B. O. Dodge*.

SS3. MÖBIUS, MARTIN. *Die Begründung der Pflanzengeographie durch Alexander von Humboldt*. [The establishment of plant geography by Alexander von Humboldt.] *Naturwiss. Wochenschr. N. F.*, 18: 521-526. 1 fig. 1919.—An appreciation of the pioneer work of von Humboldt in this field, prepared in celebration of the one hundred fiftieth anniversary of his birth.—*B. O. Dodge*.

SS4. MORRIS, DANIEL. *Botany and the Empire*. *Gard. Chron. III*, 66: 156, 163-164, 175-176, 187-188, 205, 210-211. 1919.—Presidential address, Botanical Section, British Association for the Advancement of Science. [See *Bot. Absts.* 7, Entry 72, where author's name is incorrectly given as "J. C." Morris.]—*Neil E. Stevens*.

SS5. MURRILL, W. A. *The lotus of ancient Egypt*. *Jour. New York Bot. Gard.* 20: 231. 1919.—The plant known in America as "Egyptian lotus" was held sacred in India, China, and Japan, but never used as decorative motive by the ancient Egyptians.—*M. F. Warner*.

SS6. NEUMANN, FELIX. *Leonhard Fuchs, physician and botanist, 1501-1566*. *Ann. Rept. Smithsonian Inst.* 1917: 635-647. *Pl. 1-7*. 1919.

SS7. NUTTALL, ZELIA. *The flower lovers and gardeners of ancient Mexico*. *Jour. Internat. Gard. Club* 3: 364-379. *Illus.* 1919.—Great love of flowers was characteristic of the Mexicans from time immemorial, and a unique and ingenious botanical nomenclature is exhibited in the Nahuatl or Mexican tongue, in which certain words used as prefixes or suffixes to plant names convey information as to their qualities or habitats; this seems to be a legacy from a very old civilization. An episode of the reign of Montezuma is given showing high value placed on rare plants. Horticulturists and florists were of great importance. Sahagun's *Historia general de la Nueva España* is quoted, and drawings of Sahagun reproduced showing gardeners at work in sowing and transplanting, picking flowers and making floral designs. Specimen "flower songs" from the Nahuatl are also given.—*M. F. Warner*.

SS8. NUTTALL, ZELIA. *The gardens of ancient Mexico. II*. *Jour. Internat. Gard. Club* 3: 572-590. *Illus.* 1919 [1920].—Quotations are given from a detailed description of a native garden given by Cortés in his second letter to the Emperor Charles V in 1520, and from accounts of the gardens of Montezuma and those of Nezahualcoyotl at Texcoco. Plants observed by Hernandez in the gardens of Huaxtepec between 1570 and 1577 are mentioned. Description of the famous "Chinampas" or floating gardens, which are actually mud beds raised above the surface of the lagoon, on which vegetables and flowers for the markets of the city of Mexico are still grown at the present day, just as they were in the most remote times. There is, however, record of veritable floating gardens in the period about 1350-1400, when the Nahuas or Mexicans were required to deliver annually by way of tribute to the king of Atzcapotzalco, a raft planted with all the native trees and vegetables. [See preceding entry.]—*M. F. Warner*.

SS9. PAYNE, C. H. *A bibliographical curiosity*. *Gard. Chron. III*, 64: 7-8. 1918.—A work with title in both English and French: "The English flower garden—Le Jardin de fleurs anglais," which is without date, but in which the plates are reprints of those in the very rare "Compleat florist" of 1740.—*M. F. Warner*.

SS90. PAYNE, C. H. *Captain Bernet*. *Garden* 83: 15. 1919.—Bernet, born 1775, died 1855, was a retired army officer who began to grow seedling chrysanthemums at Toulouse in 1827. Before that time there had been little effort to obtain new varieties; Bernet in the first two years raised nearly 60, and from that time the improvement of the chrysanthemum was undertaken by many growers.—*M. F. Warner*.

891. PAYNE, C. H. *The chrysanthemum in China*. Gard. Chron. III, 64: 233-234. 1918.—An account by an early Jesuit missionary in 'Mémoires concernant l'histoire, les sciences, les arts, les mœurs, les usages, &c. des Chinois. Par les missionnaires de Pékin. Tome troisième. Paris, 1778.' A very modern discussion of the flower, strangely overlooked by other early writers on the chrysanthemum. The "Kiu-hoa" or "Chü-hwa" of the Chinese is identified with the *Matricaria* of Tournefort and other 17th and 18th century botanists, the *Chrysanthemum indicum* of the Botanical Magazine, and the *Anthemis grandiflora* of Ramatuelle, who was the first to describe it from European-grown seeds in 1792, at least 25 years after the account discussed, as this volume, though published in 1778, is dated at the end: "a Pé-King ce 3 Novembre, 1767."—*M. F. Warner*.

892. P[AYNE], C. H. *Old gardening books*. Gard. Chron. III, 64: 111. 1918.—Apropos of gardening literature, "The Gentleman and Lady's Gardener" of ROBERT EDMEADE (1776) is noted, which is not only a catalogue of seeds and plants for sale by him, but contains cultural directions and a monthly calendar of operations, together with the Latin name of each plant according to the Linnean classification.—*M. F. Warner*.

893. PAYNE, C. H. *Pierre Blancard*. Garden 82: 475-476. 1918.—Blancard was born at Marseilles April 21, 1741, and died there March 16, 1826. On his return from his fifth voyage to the Orient he introduced the chrysanthemum into Europe in 1789; it soon spread throughout Provence, was grown at the Jardin des Plantes in Paris, and is said to have been sent to Kew by CELS. It bloomed for the first time in England at Colvill's nursery in Chelsea, and was first figured in the Botanical Magazine as t. 327.—*M. F. Warner*.

894. PAYNE, C. H. *T'ao-Yüan-Ming*. Garden 82: 444, 455. 1918.—Chinese litterateur and chrysanthemum lover (365-427 A.D.). Little is told of his cultivation of the flower, save that his favorite was the variety known as "Kiu-hwa-chü" or "Nine glories." Extracts from his writings, and allusions to him in works of other Chinese authors, are quoted.—*M. F. Warner*.

895. POLLACCI, GINO. *In ricordo di Giovanni Eriosi*. Atti Ist. Bot. Univ. Pavia 17: iii-xvii. *Portrait*. 1920.—Born at Ferrara, April 26, 1846, died at Pavia, July 20, 1919.—Baccalaureate degree in engineering at the University of Ferrara. Studied also at Torino and Naples and went to Belgium and Germany for training in agriculture. Studied with Kraus and deBary. Founded the agricultural experiment station at Palermo in 1873 and gave a strong stimulus to studies in enology and vegetable pathology. In 1877 he was called to the chemico-agricultural station at Rome where he established an experimental vineyard, propagated 500 varieties of grapes and did much enological work. He was called to the chair of botany at the University of Pavia in 1883. Here he first put the botanical garden in order and reorganized the station for cryptogamic botany, of which he was director. He began the publication of "Atti" which now has reached its 250th memoir. Author of many papers on parasitic fungi and fungus diseases of plants. A leader of Italian botanists. A bibliography of 161 titles is appended.—*D. Reddick*.

896. RAVN, F. K. *Experiments in plant culture in Denmark*. Scottish Jour. Agric. 3: 207-214. 1920.—The first experiments by B. S. JÖRGENSEN in 1860 were largely modelled on those at Rothamsted. A famous pioneer in work with meadow plants was P. NIELSEN, who in 1886 was made director of the first Danish state experiment station for field work. Toward the last of the 19th century attempts were made to establish local experiments in plant culture. An outline of work at the present time is given under the following heads: I. The state experimental work in plant industry; II. Experiments conducted by the agricultural societies; III. Plant breeding in its relation to experimental work. [See also Bot. Absts. 8, Entry 69.]—*M. F. Warner*.

897. REDDICK, DONALD. *Vern Bonham Stewart*. Phytopath. 9: 111-113. *Portrait*. 1919.—A sketch of the life of V. B. Stewart (1888-1918) with a list of his botanical publications.—*Neil E. Stevens*.

898. R[ENDLE], A. B. [Anne Casimir Pyramus de Candolle.] *Jour. Botany* 57: 23-24. 1919.—His death on Oct. 3, 1918, "is for the systematic botanist the breaking of a link with the past." The son of Alphonse and grandson of Augustin Pyramus de Candolle, his botanical contributions had not the fundamental character of some of theirs, but he did useful work.—*Neil E. Stevens.*

899. RICHMOND, C. W. In memoriam—Edgar Alexander Mearns, 1856-1916. *Ann. Rept. Smithsonian Inst.* 1917: 649-662. *Portrait.* [1919].—Dr. Mearns collected plants extensively in various regions while on duty as surgeon in the U. S. A. and was naturalist on the Roosevelt expedition to Africa.—*Neil E. Stevens.*

900. ROBERTS, W. Brunton, of Birmingham. *Gard. Chron.* III, 64: 142. 1918.—The recently published "Catalogue of the Birmingham collection" of the Birmingham public library, includes the "Catalogue of plants, botanically arranged according to the system of Linnaeus" of John Brunton & Co., 83 High Street, Birmingham, 1777; also one of forest and fruit trees issued by Brunton & Forbes in 1782, and another catalogue of trees in 1787, when the firm was Brunton, Forbes & Hunter.—*M. F. Warner.*

901. ROBERTS, W. An eighteenth-century London seedsman. *Gard. Chron.* III, 63: 223. 1918.—"A Catalogue of several sorts of grass seeds, sold by Nathaniel Powell, at the King's Head, near Fetter Lane end, in Holborn, London," is a series of cultural directions, followed by "A Short account of the improvement of land by several sorts of seeds," by the same person, and, though without date, the format and typography place them in the early years of the 18th century. POWELL's name as seedsman at 39, Holborn, appeared in the London directories until 1771, and it is possible that he may have been the Nathaniel Powell whose death is recorded in the Gentleman's Magazine as taking place at Bristol on March 1, 1773. His catalogue deals almost exclusively with trefoil, clover, sainfoin, ryegrass, and lucerne, and Powell presents their advantages in a manner which suggests thorough observation and practical experience.—*M. F. Warner.*

902. [ROBERTS, W.] Florists' feasts; a 16th century custom; as old as gillyflowers and carnations. *The Times* [London] No. 43134 (June 24). 16. 1919.—Custom probably introduced to England by Flemish cloth manufacturers settling in 1597 at Norwich, and certainly flourishing as early as 1631, when RALPH KNEVET wrote a play, "Rhodion and Iris," for presentation at the Norwich florists' feast. Nearly all the exhibitions of flowers and fruits of the 18th and early 19th century were held at public houses, where an inexpensive "ordinary" was provided. Flowers, fruits, and vegetables of all sorts (tulips, carnations, auriculas, melons, gooseberries, and cabbages) were the subjects of competition, but with the institution in the 19th century of the Royal Horticultural Society and those of the various counties, these florists' feasts, having served their purpose in the encouragement of horticulture, disappeared.—*M. F. Warner.*

903. [ROBERTS, W.] Old gardening literature. *The Times* [London] Lit. Suppl. No. 872 (Oct. 3) 472. 1918.—Rare books on agriculture, gardening, and botany, sold during the past season, with note of some of the libraries rich in such literature.—*Neil E. Stevens.*

904. ROBERTS, W. Tulip Paul Diack. *Gard. Chron.* III, 64: 201. 1918.—In the second of his satires, "Love of Fame, the universal passion," the Rev. EDWARD YOUNG (best known as author of the "Night thoughts") deals poetically with this flower, and in his key says that "Paul Diack, who gave name to a tulip, was an honest, topping old citizen of London." The name is possibly of Dutch or Flemish origin, and may have been Dyck.—*M. F. Warner.*

905. ROBERTS, W. A Whitechapel botanical garden. *Gard. Chron.* III, 64: 245-246. *Fig. 98-99.* 1918.—The garden of WILLIAM BENNETT, "Cornfactor and Biscuit Baker," situated in Whitechapel Fields, next the half-way house to Stepney, only known from the auction catalogue of its contents, to be sold 27th March, 1766. A list of the botanical names

in this catalog is given, showing that several of these plants were grown by Bennett previous to the dates recorded for their introduction into Great Britain, as for instance *Selago spuria*, supposed to have been introduced in 1779, and *Pisonia aculeata* and *Ruellia ciliata*, in 1806. Although there is no other intimation of the fact, the large number of certain plants, e. g., 350 pineapples, suggests that Bennett may have traded in plants.—*M. F. Warner*.

906. SCHIPS, M. **Lionardo da Vinci als Naturforscher.** [Leonardo da Vinci as a naturalist.] *Naturwiss. Wochenschr. N. F.*, 18: 256–259. 1919.

907. SCHRAMM, J. R. **Botanical Abstracts.** *Science* 49: 195–196. 1919.—An account of the organization of the Board of Control and the plans for this journal.—*Neil E. Stevens*.

908. SHEAR, C. L., and N. E. STEVENS. **Plant pathology to-day.** *Sci. Monthly* 7: 235–243. 1918.—The development of plant pathology, especially in America, is discussed and some of the significant papers are cited.—*B. O. Dodge*.

909. SIMMONS, J. R. **The historic trees of Massachusetts.** 8 vo., xxi + 139 p. *Illus.* Marshall Jones Company: Boston, 1919.

910. SINGLETON, ESTHER. **The Shakespeare garden.** *Jour. Internat. Garden Club* 3: 545–556. *Illus.* 1919 [1920].—Evolution of the garden of delight; plants proper to the English garden in ALEXANDER NECKAN'S "De naturis rerum" (12th century), and those enumerated by JOHN DE GARLANDE and by GUILLAUME DE LORRIS in his "Roman de la Rose" in the 13th century; the formal garden, symbolism of gardens, and development of garden in Tudor times, are discussed, with many extracts from late 16th century literature.—*M. F. Warner*.

911. SPINDEN, H. J. **Origin of American agriculture; ancient pottery reveals the invention and spread of agriculture in America.** *Sci. Amer. Suppl.* 88: 120–121, 127. *Illus.* 1919.—"The most reliable information regarding the agriculture of the past lies in the pottery which was inseparably associated with it." Earliest records of cultivated plants are found in Mesopotamia, Egypt, Mexico, and Peru. Illustrations are from pottery in form of ears of maize (Mexican and Peruvian), and squashes (Peruvian).—*M. F. Warner*.

912. STEVENS, N. E. **American botany and the great war.** *Science* 48: 177–179. 1918.—Several incidental effects of the war on botanical work are mentioned, but the organization of phytopathologists for emergency work is given most attention.—*B. O. Dodge*.

913. SYDOW, HANS. **Ferdinand Theissen, S. J.** *Ann. Mycol.* 17: 134–139. 1919 [1920].—An appreciation, with brief biography, of Ferdinand Thiessen (1877–1919). A bibliography of his 52 mycological contributions is appended. [See also *Bot. Absts.* 7, Entry 71.]—*H. S. Jackson*.

914. TONI, G. B. DE. **Fabio Colonna e l'eterocarpia.** *Riv. Biol.* 1: 46–49. 1919.—Colonna's observations on heterocarpy. Many examples of this phenomenon are afforded by *Calendula*, and FUCHS in his "De historia stirpium commentarii" (1542) shows a figure of *C. officinalis* with akenes arranged in a semi-circle, but does not recognize the polymorphic nature of the fruit. Just 50 years later Fabio Colonna (1567–1640), in his first book, "Phytobasanos sive Plantarum aliquot historia" (1592) p. 52–59, describes and figures the plant called *Clymenon Dioscoridis*, now referred to *Calendula officinalis*, which he says is characterized by 3 different forms of fruits. This peculiarity of *C. officinalis* was later figured by ELIZABETH BLACKWELL in her "Curious herbal" (1739), by GAERTNER, "De fructibus et seminibus plantarum" (1788), and by POIRET in "Encyclopédie méthodique," *Suppl.* 5: 188. Tab. 715.—*M. F. Warner*.

915. TRUE, R. H. **Notes on the early history of the pecan in America.** *Ann. Rept. Smithsonian Inst.* 1917: 435–448. [1919].—A series of notes from unpublished or inaccessible sources, dealing with the discovery, introduction into Europe, botanical description, early cultivation, and improvement of the pecan.—*Neil E. Stevens*.

916. VAUPEL, FRIEDRICH. **Karl Schmidt.** *Monatsschr. Kakteenk.* 29: 73-74. 1 fig. 1919.—Karl Schmidt of the firm of Haage & Schmidt was born Dec. 23, 1848, and died Feb. 26, 1919, at Erfurt.—*A. S. Hitchcock.*

917. VIOLA, BARTHOLOMEW. **The history of sugar.** *Louisiana Planter and Sugar Manufacturer* 65: 379-381, 398-399. 5 fig. 1920.—A history of sugar and of sugar manufacture from very early times. The sugar cane industry is also traced from country to country.—*C. W. Edgerton.*

918. WARNER, M. F. **Bibliographical opportunities in horticulture.** *Bull. Amer. Library Assoc.* 13³: 178-184. 1919.—The following are suggested as important and interesting lines of work in this field: Continuation of the check list of American horticultural books; the preparation of much needed indexes of horticultural periodicals; the collection of data on early American journals and societies; critical bibliographical work; and biographical and historical research.—*Neil E. Stevens.*

919. WARNER, M. F. **Date of Robert Thompson's birth.** *Gard. Chron.* III, 64: 116-117. 1918.—Mr. BUNYARD's sketch, March 23, 1918, quotes Thompson's own statement from the Chiswick records, that he was born in 1799, which would seem to be conclusive. But sketches in *Journal of Horticulture* in 1869 and 1877, while admitting that there is no birth register by which the precise date can be fixed, infer that it was in September, 1798, from the fact that his baptism occurred on the 16th of October of that year.—*M. F. Warner.*

920. WARNER, M. F. **Horticultural libraries in the United States.** *Gard. Chron.* III, 65: 247. 1919.—The collection of the Library of the U. S. Department of Agriculture in its relation to horticulture, with some comment on its administration and relation to other libraries.—*Neil E. Stevens.*

921. WHITE, O. E. **Our common garden vegetables; their history and their origin.** *Brooklyn Bot. Gard. Leaflet* VI, 3: 1-19. Fig. 1-5. 1918.—Popular account with list of common edible plants, their place of origin, and probable antiquity of cultivation.—*Neil E. Stevens.*

922. WICKSON, E. J. **Beginnings of agricultural education and research in California.** *Rept. California Agric. Exp. Sta.* 1917/18: 35-101. 1918.—Discusses the following: Plant introduction and distribution (p. 67-69); grasses and forage plants (p. 69-72), cereals (p. 72-74), forestry (p. 74-77), viticulture (p. 77-79), horticulture (p. 79-83), plant diseases (p. 86-88).—*Neil E. Stevens.*

923. WILDEMAN, ÉMILE DE. **Alfred Cogniaux (1841-1916).** *Bull. Jard. Bot. Bruxelles* 5: i-xxx. *Portrait.* 1919.—Account of life and botanical work of Cogniaux, who in later years devoted himself to the Cucurbitaceae, Melastomaceae, and Orchidaceae. A list of his works, in chronological order from 1863 to 1916, comprises over 150 titles.—*Neil E. Stevens.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 939, 1049, 1079, 1084, 1115)

924. ANONYMOUS. [Rev. of: DYMES, T. A. **The nature study of plants in theory and practice for the hobby-botanist.** xviii + 173 p., 54 fig. Society for Promoting Christian Knowledge: London, 1920.] *Sci. Prog.* [London] 15: 320. 1920.

925. ANONYMOUS. [Rev. of: DYMES, THOMAS ALFRED (Introduction by F. E. WEISS). **The nature study of plants in theory and practice for the hobby-botanist.** xviii + 173 p., 54 fig. Society for Promoting Christian Knowledge: London, 1920.] *Jour. Botany* 58: 277-278. 1920.

926. COOK, MEL. T. *College botany*. 392 p. J. B. Lippincott & Co.: Philadelphia, 1920.

927. DICKSON, B. T. Do our agricultural colleges educate? *Sci. Agric.* 1: 12-13. 1921.—This article is a plea for rational education and the consequent diminution of the importance of the final examination. The fundamental question is whether students are trained to think. The suggestion is made that the "*seminar*" method be used more, even in undergraduate courses, and that final examinations be replaced by unannounced tests during term, combined with carefully checked laboratory work.—*B. T. Dickson*.

928. HOLMBOE, JENS. *Den botaniske afdeling*. [The botanical section.] Bergens Mus. Aarsberetning 1917-1918: 36-44. 1918.—Annual report of development of herbarium, botanical garden, conservatory, and botanical laboratory.—*A. Gundersen*.

929. HOLMBOE, JENS. *Den botaniske afdeling*. [The botanical section.] Bergens Mus. Aarsberetning 1918-1919: 37-45. 1919.—Annual report.—*A. Gundersen*.

930. JONES, W. NEILSON, AND M. C. RAYNER. *A text book of plant biology*. viii + 262 p., 6 pl., 36 fig. Methuen & Co., Ltd.: London, 1920.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

(See in this issue Entries 1096, 1103, 1119, 1205, 1237, 1574)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

G. D. FULLER, *Assistant Editor*

(See also in this issue Entries 791, 809, 812, 883, 1000, 1032, 1033, 1043, 1224, 1227, 1235, 1236, 1238, 1239, 1240, 1251, 1252, 1254, 1256, 1257, 1259, 1261, 1265, 1266, 1267, 1316, 1364, 1466, 1489, 1532, 1549, 1551, 1560)

GENERAL, FACTORS, MEASUREMENTS

931. DARWIN, F. *A phaenological study*. *New Phytol.* 18: 287-298. 1919.—A record is given of the flowering dates of 259 of the commoner plants near Brookthorpe, Gloucestershire, England, for the years 1917, 1918, and 1919. Tables are also given of the mean weekly temperatures and of the deviations from the normal.—*I. F. Lewis*.

932. FRITSCH, F. E. *Algal ecology. Freshwater and terrestrial forms*. *Jour. Ecol.* 8: 68-76. 1920.—A review of recent contributions to the ecology of freshwater algae. Among the notable papers are those by MACCAUGHEY on Hawaiian forms (see Bot. Absts. 1, Entry 200), by TRANSEAU on *Spirogyra* hybrids (see Bot. Absts. 2, Entry 715), by ELMORE on the diatoms of Devil's Lake (see Bot. Absts. 2, Entry 10), and by CHODAT on some alpine species. Among the forms noted are *Oscillatoria*, *Coelastrum*, *Volvox*, *Euglena*, and *Hormidium*.—*Geo. D. Fuller*.

933. FRITSCH, F. E. *Algal ecology. Marine forms*. *Jour. Ecol.* 8: 66-68. 1920.—In a review of some of the recent contributions to the ecology of marine algae the principal points relate to the distribution of the Laminariaceae on the Pacific coast of North America and about the Orkney Islands. Some data by SAUVAGEAU (see Bot. Absts. 1, Entry 1585) on the distribution and naturalization of forms occurring in the southern portion of the Bay of Biscay are noted as well as an ecological discussion of the marine species of the Hawaiian Archipelago by MACCAUGHEY (see Bot. Absts. 1, Entry 200).—*Geo. D. Fuller*.

934. FULLER, GEORGE D. *Vegetation of a glacial plunge basin.* [Rev. of: PETRY, LOREN C. *Studies of the vegetation of New York State. II. The vegetation of a glacial plunge basin and its relation to temperature.* Bull. Torrey Bot. Club 45: 203-210. 1918 (see Bot. Absts. 1, Entry 835).] Bot. Gaz. 67: 184. 1919.

935. GAIN, EDMOND, ET ANDRE GAIN. *Différences thermique de l'ubac à l'adret d'une vallée lacustre.* [Temperature differences between the shaded slope and the sunny slope of a lacustrine valley.] Compt. Rend. Acad. Sci. Paris 170: 191-194. 1920.—The water of the lake is found at times to have a temperature at its surface of 4-6°C. higher than the soil on the adjacent slopes. The temperature of the soil at 1 dm. beneath the surface on the northern sunny slope is usually about 1°C. higher than that of the southern shaded slope. A like difference is found in the water of the streams entering the lake from the two slopes respectively.—C. H. and W. K. Farr.

936. GRAY, JOHN, AND GEORGE J. PEIRCE. *The influence of light upon the action of stomata and its relation to the transpiration of certain grains.* Amer. Jour. Bot. 6: 131-155. 18 fig. 1919.—See Bot. Absts. 3, Entry 436.

937. JOHNSTON, EARL S. *Climatic conditions in a greenhouse as measured by plant growth.* [The author's abstract of a paper read before the American Meteorological Society, April 22, 1920.] Monthly Weather Rev. 48: 215. 1920.

938. KEEN, B. A. *Forecasting frosts.* Nature 104: 450-451. 1920.—Review of observations by BOUSSINGAULT, HELLMAN, SCHUBERT, J. WARREN SMITH, HAZEN, O'GARA, and T. B. FRANKLIN. "Up to the present no complete correlation has been made of frost in any particular locality and its causes. For this purpose an examination by statistical methods of a series of continuous observations (of the automatic recording type) of meteorological factors is needed."—O. A. Stevens.

939. MICHAEL, ELLIS L. *Marine ecology and the coefficient of association: a plea in behalf of quantitative biology.* Jour. Ecol. 8: 54-59. 1920.—The writer examines the various formulae used for deriving the coefficients of association as applied to plankton studies and finds them all deficient. Emphasizing the importance of quantitative results he demands that proficiency in mathematics be regarded as a prerequisite for major work in biology.—Geo. D. Fuller.

940. SHULL, CHARLES A. *Correlation of wind flow and temperature with evaporation.* Plant World 22: 210-215. Fig. 1919.—Statistical study of the data obtained from evaporation station records from Lawrence, Kansas, shows that the correlation between air movement and evaporation is 0.29 ± 0.027 , and between temperature and evaporation the correlation is 0.687 ± 0.0156 .—Charles A. Shull.

STRUCTURE AND BEHAVIOR

941. CROCKER, WILLIAM. *Buried weed seeds.* [Rev. of: BRENCHLEY, WINIFRED E. *Buried weed seeds.* Jour. Agric. Sci. 9: 1-31. 1918 (see Bot. Absts. 2, Entry 615).] Bot. Gaz. 67: 515-516. 1919.—The reviewer regards the author's conclusions justified, but records her failure to note the very similar studies and conclusions of PETER, BEAL, and DUVEL.—H. C. Cowles.

942. CROCKER, WILLIAM. *Osmotic pressure of epiphytes.* [Rev. of: HARRIS, J. ARTHUR. *On the osmotic concentration of the tissue fluids of phanerogamic epiphytes.* Amer. Jour. Bot. 5: 490-506. 1918 (see Bot. Absts. 1, Entry 829; 8, Entry 944).] Bot. Gaz. 67: 520. 1919.

943. DOUGLASS, A. E. *Climatic cycles and tree growth: a study of the annual rings of trees in relation to climate and solar activity.* Carnegie Inst. Washington Publ. 289. 127 p., pl. 1-12, fig. 1-40. 1919.—Measurements and dates of formation of the annual rings of 230

trees, some over 2000 years old, were used as a basis for the study. Yellow pine (*Pinus ponderosa*) from Arizona and sequoia (*Sequoia gigantea*) from the Californian high Sierras furnished most of the specimens, although a considerable collection of chiefly Scotch pine (*Pinus silvestris*) with some spruce (*Picea excelsa*) was made in the Baltic drainage district of northern Europe, a smaller collection of hemlock (*Tsuga canadensis*) in Vermont, and another of Douglas fir (*Pseudotsuga mucronata*) in Oregon. Variations in the annual rings of individual trees, which in many cases were a number of miles apart, were often so uniform and characteristic that they permitted ready cross-identification. The fluctuations in growth reflected the sun-spot cycle or its multiples and the correlation with rainfall and temperature was shown to be close over the entire range of existing meteorological data. The correspondence of maxima and minima of these climatic variables with those of sun-spots indicates a physical connection between solar activity and terrestrial weather. Although the study of cycles is not considered complete the following conspicuous periods seem to be evident in the rates of growth: A half, a full, a double, a triple, and a triple triple sun-spot period—the sun-spot period being 10–13 years. Although these frequencies of maxima and minima in the growth curves are common to all the trees, the positions are sometimes regularly displaced, as, for example, in the Vermont trees in which the maximum growth regularly antedated the sun-spot maximum by about 3 years. In addition, the curves of tree growth exhibit a complex combination of short periods, including a prominent cycle of about 2 years; other persistent cycles recur in periods of 19, 14, 10, and 7 years. It was found that the trees' year begins in autumn and that double rings are indicative of spring drought. In dry climates the thickness of a ring is proportional to the rainfall with an accuracy of 70 per cent and a still closer correspondence may be expressed by an empirical formula that takes into account the distribution of the effect of rain over several adjoining years. For the discussion of curve-smoothing, identification of rings, dating of rings, curve standardization for the decreasing rate of growth with increasing age of trees, and the methods of tree selection the original must be consulted. An instrument (the automatic optical periodograph) was devised to reduce the influence of individual judgment in the determination of periodic changes in the growth rate. With it data may be examined for periodicity of any frequency and decisive conclusions drawn concerning changes in periods, recurrence of periods, and constancy of period length. Its description and directions for use cannot be abstracted.—H. E. Pulling.

944. FULLER, GEORGE D. Sap concentration in epiphytes. [Rev. of: (1) HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of desert Lorantheae. Mem. Torrey Bot. Club 17: 307–315. 1918 (see Bot. Absts. 1, Entry 684, 828). (2) HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of phanerogamic epiphytes. Amer. Jour. Bot. 5: 490–506. 1918 (see Bot. Absts. 1, Entry 829; 8, Entry 942).] Bot. Gaz. 67: 374–375. 1919.

945. GARDNER, MAX W. The mode of dissemination of fungus and bacterial diseases of plants. Rept. Michigan Acad. Sci. 20: 357–423. 1918.—See Bot. Absts. 3, Entry 764.

946. JONES, FRANK MORTON. Another pitcher-plant insect (Diptera, Sciarinae). Entomol. News 31: 91–94. 1920.—Description of a new fly, to which attention was first called in 1909 by MACFARLANE. Other flies found in pitchers of different species of *Sarracenia* are mentioned.—O. A. Stevens.

947. MILLER, DAVID. A new fungus-gnat which fertilizes *Corysanthes oblonga* Hook. New Zealand Jour. Sci. and Tech. 1: 4. 1918.—The gnat is *Exechia thomsoni*.—H. C. Cowles.

948. UPHOF, J. C. TH. Cold-resistance as an ecological factor in the geographical distribution of cacti. Jour. Ecol. 8: 41–53. Pl., 6 fig. 1920.—From observations in the desert regions of Arizona and from experiments in the laboratory the conclusion is reached that the protoplasm of different species offers different degrees of resistance to low temperature and that this resistance is a hereditary physiological characteristic of the species. The temperature which damages a plant will kill it if continued long enough.—Some species have a rela-

tively thick integument which is somewhat resistant to low temperatures of short duration such as are common in the Arizona and adjacent deserts. A large range of resistance was found in different species.—*Geo. D. Fuller.*

949. WYLIE, R. B. Trimorphism of *Pontederia*. [Rev. of: HAZEN, TRACY E. *The trimorphism and insect visitors of Pontederia*. Mem. Torrey Bot. Club 17: 459-484. 1918 (see Bot. Absts. 1, Entry 830).] Bot. Gaz. 67: 271-272. 1919.

VEGETATION

950. FULLER, GEORGE D. Distribution of *Pinus Banksiana* and *Thuja occidentalis*. [Rev. of: FERNALD, M. L. Lithological factors limiting the ranges of *Pinus Banksiana* and *Thuja occidentalis*. *Rhodora* 21: 41-67. 1919 (see Bot. Absts. 4, Entry 283).] Bot. Gaz. 68: 149-150. 1919.—The reviewer feels that the author has criticized somewhat too severely HUTCHINSON's theory as to the cause of the distribution of these two trees (see Bot. Absts. 4, Entry 190). It is felt that there is truth in both theories, and that they are not necessarily nharmonious with one another.—*H. C. Cowles.*

951. FULLER, GEORGE D. Vegetation of Cape Breton. [Rev. of: NICHOLS, GEORGE E. *The vegetation of northern Cape Breton Island, Nova Scotia*. Trans. Connecticut Acad. Arts and Sci. 22: 249-467. 70 fig. 1918 (see Bot. Absts. 1, Entry 833).] Bot. Gaz. 67: 370-373. 1919.—“In its comprehensive character, its abundance of detail, and its notable contributions to various phases of ecology, including the relationships between deciduous and coniferous forests, the ecology of the sphagnum and of the development of raised bogs, this report stands as one of the most notable of recent years.”—*H. C. Cowles.*

952. FULLER, GEORGE D. Heath and grassland. [Rev. of: FARROW, E. P. On the ecology of the vegetation of Breckland. III. General effects of rabbits on the vegetation. IV. Experiments mainly relating to the available water supply. V. Observations relating to competition between plants. VI. Characteristic bare areas and sand hummocks. *Jour. Ecol.* 5: 1-18, 104-112, 155-172. 1917; 6: 144-152. 1918 (see Bot. Absts. 1, Entry 824).] Bot. Gaz. 67: 181-182. 1919.

953. HAUMAN, LUCIEN. La végétation des hautes Cordilleres de Mendoza (République Argentine). [The vegetation of the high Cordilleras of Mendoza.] An. Soc. Cien. Argentina 86: 121-188, 225-348. 21 pl., 7 fig. 1918.—This article gives a rather detailed description of a scanty alpine vegetation found on the high Andes between 31 and 37°S. latitude at elevations from 2000 to 4200 meters. This region possesses many peaks exceeding 6000 m., the highest and best known being Aconcagua with an altitude of 7020 m. These are snow capped and possess a good development of glaciers, from which flow tortuous and variable streams. These furnish almost the entire water supply for the sparse vegetation as the growing season in these mountains is almost entirely without rain. The temperature records are imperfect but an important factor is seen in the light frosts which are common throughout the growing season. One station at 2700 m. gives an annual mean temperature of 6.5°C., with mean maximum of 13.4°C., and a mean minimum of 0.1°C. Humidity is at all times low while wind velocity is decidedly high and constant. Precipitation as recorded at 2000 m. seems to be irregular and variable, the annual amounts ranging from 20 to 69 cm., occurring principally in the colder months in the form of snow. This deficiency of rainfall combined with other factors makes the vegetation not only very scanty but limited to valleys and slopes which possess streams or seepage water from the glaciers and snowfields. In the absence of mountain lakes aquatic vegetation is scanty and anything like mountain meadows are limited to the stream edges and small alluvial fans. Such grassy associations appear to closely resemble similar alpine areas elsewhere. Related to the alpine meadows are the “high Andean oases” formed at 3200-3600 m. where at the foot of talus or morainal slopes some alluvial soil has accumulated. These oases vary in size but rarely reach 100 m. in diameter. They are often dominated by the

juncaceous *Andesia bisexualis* 15 to 30 cm. high forming a thick carpet.—Trees are absent throughout, and even in the valleys the shrubs do not exceed 2 m. in height. *Adesmia piniifolia*, a legume, is the most plentiful shrub, while among the others are *Ephedra americana andina*, *Berberis empetrifolia*, and *Senecio uspallatensis*. *Opuntia andicola*, the only cactus of the region, together with *Azorella Gilliesii* and *Laretia acaulis*, 2 umbellifers, form a curious trio of herbaceous cushion plants confined to the valleys.—Upon the more exposed parts of the mountains there is a notable abundance of prostrate, tufted, rosette and cushion plants often with a striking development of large woody roots. These growth-forms are accounted for as being in response to exposure to high winds and dependence upon a subterranean water supply. Upon the slopes *Adesmia trijuga*, with shrubby cushions 30 cm. high, together with *Poa chilensis* and *Stipa speciosa* in tufts, dominate the area, forming scattered dots over the rocky landscape. Most abundant upon the summits between 3000 and 4000 m. are the subterranean woody cushions of *Adesmia subterranea*, whose leaves form a carpet upon the surface. Accompanying this species with similar growth-forms are the more uncommon *Verbena uniflora* and *Oxalis bryoides*.—The entire vascular flora consists of 417 species, including 1 pteridophyte, *Cystopteris fragilis*, and one gymnosperm, *Ephedra*. Among the best represented families are Compositae with 85 species, Leguminosae with 36, Gramineae with 34, Cruciferae with 28, Portulacaceae with 15, Umbelliferae with 15, Rosaceae with 12, Cyperaceae with 12, Oxalidaceae with 10, and Violaceae and Caryophyllaceae with 9 species each. Well represented genera are *Senecio* with 26 species, *Adesmia* with 16, *Calandrinia* with 15, *Astragalus* with 12, *Oxalis* with 10, and *Viola* with 9. The scarcity of the Saxifragaceae, with 2 rare species, and the entire absence of the Ericaceae and Primulaceae, are worthy of note. Lichens, abundant at the lower altitudes, become very rare above 2800 m. mosses are common about springs up to 3600 m. but liverworts are entirely lacking. More than one-half the species (210) are classed as belonging to the central Andes, 60 being endemic. There are no endemic genera but notable among this group are such aggregates as 6 species of *Adesmia*, 2 of *Boopis*, 12 of *Senecio*, and 2 new varieties of *Koeleria*. The other elements are the northern tropical with 16 species, the subtropical with 21 species, the basal Argentinian with 56 species, the southern Andean with 10 species, the Patagonian with 73 species, and the cosmopolitan and introduced species numbering respectively 28 and 17. This introduced element must be regarded as small when it is recalled that the Mendoza River valley has been the trans-Andean route for centuries.—There is a carefully and fully annotated list of the vascular flora of the regions based on the collections of the author and those of other explorers, and finally there is a bibliography of 54 titles.—Photographs and drawings illustrate many of the less known species.—Geo. D. Fuller.

954. RÜBEL, EDUARD. Über die Entwicklung der Gesellschaftsmorphologie. [The evolution of the morphology of plant communities.] Jour. Ecol. 8: 18–40. 1920. The author gives an outline of the history of statistical investigations of vegetation from Humboldt (1807) to the present, tracing an evolution in the study of the forms of plant communities, and treating the work of nearly 30 different workers in some 24 pages.—In different plant communities quantitative results have been sought for such matters as abundance, dominance and its sub-classes, manner of occurrence (gregarious, solitary, etc.), frequency, life-forms (growth-forms) and layers, specificity of species to associations ("Gesellschaftstreue"). The aim is the quantitative expression of relations obtaining in such communities for the investigation of associations and succession and for the purposes of plant geography. The varying forms of associations are well characterized by these results. There is no finality in any method or combinations of methods. The future will undoubtedly show greater advances. The author emphasizes the need for the study of forms in distinction from their ecology. He states that hitherto the work has been too largely concerned with the ecology of plant communities and that it should be more concerned with the morphology of plant communities in order that the results obtained may be applied in the elucidation of successions.—The paper brings into view, in its sketch of the evolution of statistical methods for over a century of activity, that the quantitative results so far reached are sometimes really quantitative only in the sense of being numerical description.—H. de Forest.

955. SALISBURY, E. J. A draft scheme for the representation of British vegetation in black and white. Jour. Ecol. 8: 60-61. Pl. 1920.—The various types of vegetation are represented by rather simple symbols.—*Geo. D. Fuller.*

956. SHREVE, FORREST. Vegetation of Washington and Idaho. [Rev. of: WEAVER, J. E. A study of the vegetation of Southeastern Washington and adjacent Idaho. Univ. Nebraska Studies 17: 1-114. 48 fig. 1917.] Plant World 22: 216-217. 1919.

FLORISTICS

957. ANDERSON, J. P. Plants of southeastern Alaska. Proc. Iowa Acad. Sci. 25: 427-449. 1920.—A catalogue of pteridophytes and spermatophytes collected mostly at Sitka and Juneau. Habitat and abundance are noted.—*H. S. Conard.*

958. ANDREWS, A. LEROY. Bryological notes. V. *Scapania nimbosa* from Norway. Torreyia 19: 49-51. 1919.—See Bot. Absts. 3, Entry 699.

959. ANONYMOUS. Geography of U. S. botanical drugs. Pharm. Era 52: 63-66, 89-92. 9 fig., 2 maps. 1919.—See Bot. Absts. 3, Entry 424.

960. ARBER, AGNES. Aquatic angiosperms: the significance of their systematic distribution. Jour. Botany 57: 83-86. 1919.—See Bot. Absts. 3, Entry 733.

961. CLUTE, WILLARD N. Rarity of *Conopholis*. Amer. Bot. 25: 108. 1919.—*Conopholis americana* is regarded as very rare in most of its range. At Saeger's Lake, Valparaiso, Indiana, several acres thickly strewn with this plant were noted in 1919.—*W. N. Clute.*

962. DEANE, WALTER. *Amsinckia* in New England. Rhodora 21: 38-40. 1919.—An account of the occurrence of the genus in New England.—*James P. Poole.*

963. FULLER, GEORGE D. Vegetation of Newfoundland. [Rev. of: FERNALD, M. L. The contrast in the floras of eastern and western Newfoundland. Amer. Jour. Bot. 5: 237-247. 3 pl. 1918 (see Bot. Absts. 1, Entry 469).] Bot. Gaz. 67: 101. 1919.

964. GERSTLAUER, L. Neue Arten und Standorte der Flora von Augsburg und Mittelschwaben. [Species and stations new to the flora of Augsburg and Middle Swabia.] Ber. Naturw. Verein. Schwaben u. Neuburg 42: 251-263. 1919.—This article is a continuation of earlier articles published in the same transactions. The author lists 10 pteridophytes and 161 spermatophytes from the region indicated, giving in each case one or more definite stations with the names of the collectors. Eighteen species and 14 hybrids are reported for the first time. At the close of the paper, certain records in Weinhart and Lutzenberger's "Flora von Augsburg" are corrected.—*A. W. Evans.*

965. GLEASON, H. A. *Rhamnus dahurica* in Michigan. Torreyia 19: 141-142. 1919.—Two wild trees of this species have been found in a swamp south of Ann Arbor, Michigan, 500 yards or more from any residence. Only 1 cultivated tree of the species is known in the vicinity, and as it is smaller it cannot be the parent of the wild trees.—*J. C. Nelson.*

966. HARPER, ROLAND M. *Tumion taxifolium* in Georgia. Torreyia 19: 119-122. 1919.—*Tumion taxifolium* (Arn.) Greene, the "savin" or "stinking cedar," which has heretofore been known as occurring only in Gadsden and Liberty counties, Florida, was collected by the author in Decatur County, Georgia, on August 16, 1918, in a ravine about 100 yards north of the State line at Chattahoochee, Florida. Several trees were found, some a foot in diameter and 40 feet tall.—*J. C. Nelson.*

967. KIDDER, NATHANIEL T. *Solidago lepida*, var. *fallax* in Knox County, Maine. Rhodora 22: 77-78. 1920.—An account of the discovery of *Solidago lepida* DC. var. *fallax* Fernald on Nathan's Island, one of the outermost islands of Penobscot Bay, lying about 15 miles

southwest of Mt. Desert. The determination was made at the Gray Herbarium by Professor Fernald. The range of this variety as previously published has been Newfoundland to British Columbia, south to northern New Brunswick, northern Maine, northern Michigan, Utah, and Washington. This new station is the first south of Aroostook Valley.—*James P. Poole.*

968. KNOWLTON, C. H., W. S. RIPLEY, JR., AND C. A. WEATHERBY. Second report of the Committee on Floral Areas. *Rhodora* 22: 80–89. 1920.—This report covers the Polypodiaceae, Schizaeaceae, and Osmundaceae and is published as a part of the "Preliminary Lists of New England Plants." In addition to giving the distribution of the plants by states, the article gives considerable information as to their distribution according to ecological and soil classifications.—*James P. Poole.*

969. LONG, BAYARD. Regarding *Gentiana Andrewsii* in the coastal plain of New Jersey. *Rhodora* 22: 104–110. 1920.—The author finds that earlier records of the occurrence of this species in the region referred to were apparently due to errors in the determination of species and that in reality it is one of the rarest of plants in the Coastal Plain region. The evidence also seems to lead to the logical conclusion that the few stations reported within the region are extensions of the Piedmont region.—*James P. Poole.*

970. LONG, C. A. E. Some noteworthy *Matinicus* plants. *Rhodora* 22: 110–111. 1920.—A list of some of the more interesting plants found growing on the island of *Matinicus* by the author.—*James P. Poole.*

971. MÖRNER, CARL TH. Botaniska anteckningar från Norrlands-färder 1916–1919. [Notes from journeys in Norrland (northern Sweden) 1916–1919.] *Bot. Notiser* 1920: 33–40. 1920.—The author gives the localities for 37 species, together with geographic and ecological notes concerning them.—*P. A. Rydberg.*

972. MOUSLEY, H. Further notes on the orchids of Hatley, Stanstead County, Quebec, 1919. *Canadian Field-Nat.* 34: 44–47. 1920.—The habit and habitat of 12 species of orchids are presented. In all, 30 species of orchids were found within an area of 4 square miles.—*W. H. Emig.*

973. NELSON, JAMES C. Additions to the flora of western Oregon during 1919. *Torreyia* 20: 37–45. 1920.—Indigenous species not mentioned in Piper & Beattie's *Flora of the Northwest Coast* are found within the limits of that manual in 3 regions of western Oregon: (1) Along the Calapooia Range, (2) along the Cascades in the Mt. Jefferson region, and (3) along the lower course of the Columbia. In addition to these, the number of naturalized exotic species is constantly increasing. A list is given of 90 species collected in western Oregon during the season of 1919, none of which is mentioned in the *Flora of the Northwest Coast*; 54 of these are foreign. Of the indigenous species, 7 are from the Calapooias, 12 from Mt. Jefferson, and 5 from the lower Columbia. To the 1617 species of the *Flora of the Northwest Coast*, 309 have now been added. Previous lists have appeared in *Torreyia* 18: 21–35, 220–226.—*J. C. Nelson.*

974. PERSSON, JOHN. Till Brobytraktens flora. [Additions to the flora of the Broby region, Sweden.] *Bot. Notiser* 1920: 101–102. 1920.—The author notes 23 additions of phanerogams and mosses since the second edition of Areschoug's *Flora*. The greatest rarity of the region, *Orchis latifolia*, has disappeared, and a few others may be hard to rediscover.—*P. A. Rydberg.*

975. POOL, RAYMOND J. Pin oak in Nebraska. *Torreyia* 20: 50–52. 1920.—*Quercus palustris* Du Roi was collected by Thomas D. Howe near Table Rock, Pawnee County, Nebraska, in September, 1919, evidently native. This is the first recorded occurrence in the State. Eleven species of *Quercus* are now known to occur in Nebraska.—*J. C. Nelson.*

976. RÖLL, J. Über *Sphagnum riparium* Ang. und über seine Verbreitung im hercynischen Florengbiet. [Concerning *Sphagnum riparium* and its distribution in the Hercynic Flora.] *Hedwigia* 61: 176-182. 1919.—The stations for *Sphagnum riparium* in the Hercynic flora are recorded, together with notes on ecological factors. Apparently there are many ecological variations. In dry localities the moss is only a few centimeters high; leaves and branches are very crowded. The stem leaves vary very little but the branch leaves assume various forms, depending on the location.—*Ernst Artschwager*.

977. SAMUELSSON, GUNNAR. Anteckningar från Torneträsk-området. [Notes from the region of Torneträsk (a lake in Lapland, Sweden).] *Bot. Notiser* 1920: 51-61. 1920.—The author gives a general description of the arctic-alpine vegetation, gives lists of plants of 3 different formations, and a list of localities of nearly 150 species which had been found at altitudes not strictly belonging to their altitudinal ranges.—*P. A. Rydberg*.

978. STANDLEY, PAUL C. *Stachys lanata* in Ontario. *Rhodora* 22: 128. 1920.—The author reports the occurrence of this species near Owen Sound, Ontario. Although the literature has not been searched thoroughly he thinks that perhaps this plant, which is native of the Caucasus region, has not been reported previously from North America.—*James P. Poole*.

979. STEVENS, O. A. The geographical distribution of North Dakota plants. *Amer. Jour. Bot.* 7: 231-242. 1 fig. 1920.—The vascular plants of the North Dakota flora may be divided into 6 main groups: (1) Those which are essentially eastern in their distribution and reach only the eastern part of the state; (2) those which are eastern but extend to the western part of the state; (3) those which are essentially western and reach only the western part of the state; (4) those which are western but extend to the eastern part of the state; (5) cosmopolitan plants; and (6) introduced plants. Characteristic members of these groups are enumerated and discussed.—The state lies almost wholly within the Transition life zone. The few members of its flora which belong to the Canadian zone or to the Upper Austral zone are enumerated. The plants which are common to North Dakota and to New Mexico are studied as to their comparative distribution in the 2 states with reference to life zones.—Some sand dune species, some introduced ones, and certain others of particular interest are discussed.—*E. W. Sinnott*.

980. THOMPSON, H. STUART. Habitats of *Hypericum humifusum*. *Jour. Botany* 57: 195-196, 225-226. 1919.—This plant was found in the turf of woodland paths over limestone in northern Somerset County. In most of the texts it is said to occur in places which would indicate a gravelly, sandy, or heathy acid soil. A later observation has shown the plant chiefly confined in Cornwall and Devonshire to mossy crevices in stone walls and dry hedge banks by roadsides on granite and slate. It was found only twice on heaths or commons. One or two plants only occur in a place. The author believes that the distribution has been much influenced by man. Brief notes on the soil preference of *Juncus tenuis* and *Erodium maritimum* are given.—*K. M. Wiegand*.

981. THOMSON, GEO. M. Naturalization of animals and plants. *New Zealand Jour. Sci. and Tech.* 1: 192. 1918.

982. VOGG, L. Aussterbende Pflanzen. [Plants becoming extinct.] *Ber. Naturw. Verein Schwaben u. Neuburg* 42: 184-186. 1919.—Attention is called to the threatened disappearance of certain species in the vicinity of Kutzenhausen, Bavaria, owing to the spread of cultivation. A few of the species listed grow on a railway embankment, a few others are found in a moist forest meadow, but the majority are inhabitants of boggy meadows. In addition to the plants on the eve of extinction the accompanying species are likewise enumerated.—*A. W. Evans*.

983. WOODRUFFE-PEACOCK, E. A. *Hypericum humifusum*. Jour. Botany 57: 225. 1919.—Notes called forth by H. STUART THOMPSON's article in this journal (see Bot. Absts. 8, Entry 980). The author makes use of 50 years of very carefully kept soil records for Lincolnshire. He shows the percentage distribution of this *Hypericum* in the different soils. It is calciphobe, and typically a plant of the open woodland of the older decaying stages passing into calluna moorland. In general the observations bear out those of Thompson and BENTHAM.—K. M. Wiegand.

984. ZINSMEISTER, J. B. Weitere Beiträge zur Flora von Augsburg und Schwaben. [Further contributions to the flora of Augsburg and Swabia.] Ber. Naturw. Verein Schwaben u. Neuburg 42: 264-270. 1919.—The author lists 4 pteridophytes and 122 spermatophytes from the region in question, giving one or more definite stations in each case. A hybrid origin is indicated in 18 instances.—A. W. Evans.

APPLIED ECOLOGY

985. MUNNS, E. N. Some biological and economic aspects of chaparral. Jour. Forestry 17: 9-14. 1919.—See Bot. Absts. 1, Entry 1147; 3, Entry 560.

986. TOUMEY, J. W. The relation of gray birch to the regeneration of white pine. Jour. Forestry 17: 15-20. 1919.—See Bot. Absts. 3, Entry 578.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 768, 864, 1129, 1176, 1206, 1351, 1365, 1368, 1374, 1382, 1390, 1392, 1395, 1397, 1402, 1406, 1408, 1414, 1423, 1435, 1468, 1492, 1540, 1549, 1560, 1565)

987. ANDERSON, J. Paper from Alaska. Sci. Amer. 124: 64, 75. 3 fig. 1921.—A popular article considering the supply of pulpwood in Alaska. It is stated that the National Forests of Alaska contain resources sufficient to produce 1,500,000 tons of paper annually in perpetuity.—Chas. H. Otis.

988. ANONYMOUS. El algarroba. [The carob bean.] Informacion Agric. [Madrid] 10: 501-504. 6 fig. 1920.

989. ANONYMOUS. Grundbesitz und Vermögensabgabe in Oesterreich. [Landed estates and property taxes in Austria.] Allg. Forst- u. Jagdzeitg. 38: 61-62. 1920.—A discussion of the tax law under consideration by the Ministry of Finance. Assessments on forest estates will be upon their vastly inflated present sale value, as they fall into the classification of "large estates." Medium and small estates have a lower valuation based on pre-war values. The result will be discouraging to Austrian forestry and threatens to cause the breaking up of many large forest estates and demoralization of the lumber trade.—F. S. Baker.

990. ANONYMOUS. Mitteilungen über die Ergebnisse der Sächsischen Staatsforstverwaltung im Jahre 1918. [Administration report of state forests of Saxony for 1918.] Tharander Forst. Jahrb. 71: 264-268. 1920.—Classified tables of areas, income, and expenditures are given. The total forest area of the state forests of Saxony at the end of 1918 was 180,989 hectares, of which 172,934 hectares is forest land and 8,055 hectares non-forest land. This is an increase of only 49 hectares over 1917. The income from the state forests was 31,393,339 marks—an increase of 5,057,450 marks over 1917. The increase in income was partly due to the rising price of wood. The price per festmeter of fuelwood increased from 21.72 marks in 1913 and 27.37 marks in 1916 to 44.37 marks in 1918. The total income of the department of forestry was 32,431,903 marks—an increase of 5,228,776 marks over 1917. This is an

average income per hectare of 179.19 marks. The total expenditures, excepting the cost of the forest working plan station, was 11,367,764 marks—an increase of 3,697,011 marks over 1917. The expenditures averaged 62.81 marks per acre of forest land, that is, only 35.1 per cent of the total income.—*Joseph S. Illick.*

991. ANONYMOUS. *Die Nachzucht des Vogelbeerbaumes und der Alpenerle.* [Reproduction of mountain ash and alpine alder.] *Schweiz. Zeitschr. Forstw.* 71: 372-376. 3 pl. 1920.—A résumé of M. DECOPPER's paper read at the meeting of foresters. The mountain ash (*Sorbus aucuparia* L.) and the alpine alder (*Alnus viridis* DC.) occur throughout the forests of Switzerland from the lowest elevation to timber line. The mountain ash is especially adapted to the steep hillsides, due to its resistance to snow break. It sprouts prolifically when the main stem is broken, and grows rapidly. Reseeding is rather slow, and experiments have shown that seed should be secured from localities with similar growing conditions. The same applies to the alders.—*J. B. Hofmann.*

992. ANONYMOUS. *Oesterreichs Holzmarktlage.* [Austrian timber market conditions.] *Allg. Forst- u. Jagdzeitg.* 38: 74-75. 1920.—The timber market is in a demoralized condition. Prices are unreasonably high but indications are that the peak is not reached. Prices for different grades of lumber and round wood for the first week of March, 1920, are given.—*F. S. Baker.*

993. ANONYMOUS. *Schluss der "wilden" Holzschlägerungen im Wienerwalde.* [End of the "wild" cutting in the Vienna forest.] *Allg. Forst- u. Jagdzeitg.* 38: 69. 1920.—On account of the fire wood famine in Vienna in the winter of 1919, unregulated cutting was allowed in the Vienna forest, in which a great part of the forest was ruthlessly destroyed.—*F. S. Baker.*

994. ANONYMOUS. *The tragedy of our American forests.* *Sci. Amer.* 123: 540. 1920.

995. ANONYMOUS. *Was ist Eichengerbholz?* [What is oak tanning wood?] *Allg. Forst- u. Jagdzeitg.* 38: 63. 1920.—Oak for tanning extract is in high demand in Germany on account of the impossibility of importing foreign sources of extract due to the abnormally high price. Wood is accepted as small as 12 cm. at the small end and $\frac{3}{4}$ to $1\frac{1}{2}$ meters long. Both heart and sapwood must be generally sound. The wood is bought by weight and will bring 7.5 marks per centner delivered on board cars or ships. Farmers are urged to clear lands covered with small crooked oaks that have been hitherto unmerchantable.—*F. S. Baker.*

996. ANONYMOUS. *Die Vergrößerung der italienischen Staatsforste.* [The expansion of Italy's state forests.] *Allg. Forst- u. Jagdzeitg.* 38: 68. 1920.—A short news item. The extension of the Italian boundaries, according to the treaty of St. Germain, gives Italy important forests between the Julian Alps and Carniola. The state forest of Tarvis contained 12,000 hectares of forest, 1000 of pasture, and 10,000 of stony land unfit for agriculture; 1800 cubic meters per hectare is the average annual production.—*F. S. Baker.*

997. ANONYMOUS. *Zu den geplanten Steuermaßnahmen in Oesterreich.* [Regarding the plans for tax assessment in Austria.] *Allg. Forst- u. Jagdzeitg.* 38: 73-74. 1920.—The increased taxes on land values threaten to cause the burdening of large forest holdings with intolerable mortgages or to force their sale to the state. The land tax is increased from 25 to 40 per cent of the official net income (including the tax remissions on account of damage to the property by the elements). There is furthermore a surtax on a sliding scale depending upon the value of the property as well as the enhancement of its value during the past year. Also, a "trade tax" of $1\frac{1}{2}$ per cent is levied on all commercial transactions, but does not apply to wood cut by the owner for his own use.—*F. S. Baker.*

998. ANONYMOUS. [Rev. of: BROWN, N. C. *Forest products, their manufacture and use.* xix + 471 p. John Wiley & Sons, New York, Chapman & Hall, London, 1919.] *Sci. Prog.* [London] 15: 320. 1920.

999. ANONYMOUS. [Rev. of: HENRY, A. *Forests, woods, and trees in relation to hygiene.* xii + 214 p., 28 illus., 21 maps and plans. Constable & Co.: London, 1919.] *Sci. Prog.* 15: 145-146. 1920.

1000. BALSEMAO, E. DE. *Influencia das florestas na atmosfera.* [Influence of the forests on the atmosphere.] *Bul. Agric. Nova Goa* [Portuguese East India] 1: 152-157. 1919.—Reprint of an article from *Official Bull. of Portuguese India* for 1883, and based on an article in *Revue des Deux Mondes*.—*J. A. Stevenson.*

1001. BARBOUR, W. R. *Argentine and Paraguay forest conditions.* *Jour. Forestry* 18: 823-830. 1920.—A brief description is given of the condition of the forest in Argentina and Paraguay with some of the uses of the principal woods. The most important forest industry of the region is the production of tannin from quebracho. Very little is being done for the extension or practice of forestry, planting being mostly confined to the landscape garden and windbreaks.—*E. N. Munns.*

1002. BERGER, HANS. *Die Carl Heyersche Formel.* [Carl Heyer's formula.] *Schweiz. Zeitschr. Forstw.* 71: 290-296. 1 pl. 1920.—The author points out the discrepancy in Heuer's formula when applied to other than normal and mature forests. The use of the average increment based on yield at time of cutting distributes the increment over periods of growth that are not measurable on this basis. Comparisons with the Bade formula shows wide variations in a stand of 50 hectares 50 years old. The conclusion is reached that it would be advisable to manage the forests with the application of less formula and more common sense.—*J. B. Hofmann.*

1003. BERKHOUT, A. H. *Das Messen der Bäume hinsichtlich ihres Zuwachses.* [Growth measurements of trees.] *Schweiz. Zeitschr. Forstw.* 71: 377-379. 1920.—A formula is worked out on the basis of relation of diameter to cubic contents. Ten trees are selected in each type. One group is in small, one in medium, and one in large trees. The average diameter and cubic contents are obtained by careful measurement, and the average tree is used for stand to be studied. If desirable, the trees measured may be remeasured at any time and the annual or periodic increment may be obtained. It is recommended that the tree be climbed and measured.—*J. B. Hofmann.*

1004. BERKHOUT, A. H. *Het meten der boomen in verband met hun aanwas.* [The measurement of trees in connection with their growth.] *Mededeel. Landbouwhoogeschool Wageningen* 17: 109-225. *Fig. 16.* 1920.—It is desirable in measuring lumber for forest calculations that the laws of probability be more generally used. A great number of examples are given.—*J. C. Th. Uphof.*

1005. BOAS, I. H. *Preservation of piling against marine borers.* *Australian Forest Jour.* 3: 315-316. 1920.—The advantages of protection by impregnation with preservatives over protection by external coatings are discussed. The experience of American experts is also summarized.—*C. F. Korstian.*

1006. BOODT. *De bebossching van Drente.* [The forestation of Drente.] *Tijdschr. Nederland Heidemaatschappij* 32: 192-200. 1920.—The forestation of the province of Drente (Netherlands) is most difficult. On clay-loam soils (1) *Pinus laricio* var. *austriaca*, or (2) growing yellow lupines followed by *Picea excelsa*, are recommended. On the heather fields *Pinus sylvestris* with oak and *Picea excelsa* are advisable. The former will form the main growth whereas the latter and oak form the undergrowth.—*J. C. Th. Uphof.*

1007. BORGMANN. [Rev. of: ENDIES, M. *Lehrbuch der Waldrechnung und Forststatik.* (Text-book of forest valuation and statics.) Berlin, 1919.] *Forst. Rundschau* 21: 13. 1920.—A short general notice of the third edition noting a few additions and changes.—*F. S. Baker.*

1008. BORGMANN. [Rev. of: MARTIN, H. *Die forstliche Statik*. [Forest statics.] 2nd ed. Berlin, 1918.] *Forst. Rundschau* 21: 10-12. 1920.—A criticism of some of Martin's points of view is included.—*F. S. Baker*.

1009. BREWSTER, DONALD R. A plan for the advancement of forestry in Wisconsin. *Jour. Forestry* 18: 792-802. 1920.—The area of cut-over land in Wisconsin amounts to about three million acres. Much of this land is now idle and unproductive. The ordinary organization of the State Board of Forestry is not thought advisable and a conservation council is proposed consisting of small groups of men chosen from each congressional district. The financial support would be derived from contributions from interested parties or from assessments upon organizations. The principal lines of work of this council would be the prevention and control of fires, the expansion of state forests, the reform of tax laws, survey of timber resources, and the establishment of experiment stations to work out forest problems.—*E. N. Munns*.

1010. BREWSTER, DONALD R. A plan for combined insurance and fire protection. *Jour. Forestry* 18: 803-805. 1920.—A plan is outlined to make forest protection and insurance automatic and self-supporting, and at the same time increase the area of timber lands under forest management. All forest lands would be assessed a small amount per acre to cover the cost of this protection and insurance, with exemption to wood lots and isolated areas. Brush lands would be considered of sufficient value to warrant protection and insurance until they were placed in a productive position. The advantages claimed are that the property owner would feel he was getting protection as well as insurance, and the distribution of risk, if combined with the tax reform, would make the production of timber a safer and more attractive investment for the private owner.—*E. N. Munns*.

1011. BUTTRICK, P. L. American trees for forest planting in France. *Jour. Forestry* 18: 815-822. 1920.—A number of conifers and hardwoods are listed which have been proved of value in France for forest planting, together with a description of the sites and places where such trees would do best.—*E. N. Munns*.

1012. CHAPMAN, R. W. Physical properties of some South Australian-grown pines. *Trans. and Proc. Roy. Soc. South Australia* 40: 405-427. 1919.

1013. CHIDSEY, C. E. Knots and boles on forest trees. *Sci. Amer. Monthly* 2: 209-210. 5 fig. 1920.—Discussion of causes of the curious and varied formations of grain in timber.—*Chas. H. Otis*.

1014. DACY, G. H. Forewarnings about forest fires. *Sci. Amer.* 123: 495, 508. 2 fig. 1920.—Describes a mechanical display by the U. S. A. Forest Service which illustrates pictorially how forest fires originate.—*Chas. H. Otis*.

1015. DAHL, A. L. Winter fuel from our woodlands. *Sci. Amer.* 123: 495, 508. 2 fig. 1920.

1016. DALEY, JOHN E. Production and characteristics of Mitscherlich sulphite pulp. *Paper* 26²⁴: 17, 30. 1920.

1017. FRYER, C. P. Light burning in California forests. *Sci. Amer.* 123: 543. 1920.

1018. FULLER, GEORGE D. Forest products. [Rev. of: BROWN, N. C. *Forest products*. xix + 471 p., 120 fig. Wiley & Sons: New York, 1919.] *Bot. Gaz.* 68: 479-480. 1920.

1019. FULLER, GEORGE D. Economic woods. [Rev. of: RECORD, S. J. *Identification of the economic woods of the United States*. 157 p., 6 pl., 15 fig. Wiley & Sons: New York, 1919.] *Bot. Gaz.* 68: 480. 1919.

1020. GERRY, ELOISE. American storax production: results of different methods of tapping red gum trees. Jour. Forestry 19: 15-24. 1921.—Commercial storax used in pharmacy is obtained from the Orient. During the war extracts were made from the red gum (*Liquidambar styraciflua*). Experiments were carried out in Louisiana to determine the proper methods. Heaviest yields were obtained from trees with parallel horizontal scarification as against the vertical scarring or girdling. Tapping early in spring gave the heaviest yields. Some substance should be used to prevent the entrance of decay on the open wounds.—*E. N. Munns.*

1021. GERRY, ELOISE. Microscopy of pulpwoods. Paper 26⁷: 19-40, 50. Pl. 1-8, fig. 1-5. 1920.—A complete description of the woods and wood fibers used in the manufacture of pulp, and keys for identifying the same.—*H. N. Lee.*

1022. HAWLEY, RALPH C. Forestry at Nehasane Park. Jour. Forestry 18: 681-692. 1920.—The cuttings in this park 20 years ago were the first made under the direction of a forester. A 2nd cut has been planned under the direction of a resident forester. In the 1st cutting the selection system was used, which has been shown to be inadvisable in this type of country. Markets now accept woods which formerly were discarded, and small sizes are as much in demand as the larger ones.—Two general types are recognized, the balsam swamp or softwood land, and the hardwood type. In these the percentage of dominants in the reproduction does not differ materially from that in the older stand. Criticisms of the more recent cuttings answered by the author are: Lack of a sustained annual yield basis; 2nd cut too heavy; too rigid a diameter limit applied; cuttings show lack of immediate supervision by a forester; spruce is not increasing; cull hardwoods remain on the ground; and the large burn is not being made productive. It is shown that the work has thus far been a credit to the forestry profession, though the forester in charge has failed to secure the establishment of a thrifty forest of young growth unhampered by heavy-foliaged hardwoods. The administration and improvements made on the property are excellent.—*E. N. Munns.*

1023. HEINICKE. Die Reinertragsübersichten der Sächs. Staatsforsten für das Jahr 1918. [Net yield of state forests of Saxony for 1918.] Tharander Forst. Jahrb. 71: 59-71. 1920.—A series of 11 tables giving a classified account of the receipts and expenditures during 1918 of the 110 state forests of Saxony; also a summary of receipts and expenditures by forest districts. The total receipts from the 110 state forests was 31,616,330 marks and the expenditures 7,530,860 marks, leaving a net yield of 24,085,470 marks. The total forest capital of the state forests of Saxony is placed at 448,151,700 marks.—*Joseph S. Illick.*

1024. JENTSCH. Die Stellung des Waldes und der Waldwirtschaft im Volksstaate mit besonderer Beziehung auf Sachsen. [Where forestry stands in Germany.] Tharander Forst. Jahrb. 71: 1-29. 1920.—The war made heavy demands upon the forests of Germany which will continue during the reconstruction period. Methods of handling and controlling forests will change in consequence of the war and the subsequent revolution. Important economic questions and policies are discussed, among them the socialization of forests, an embargo on timber, effect of rising prices of wood on forest management, and stronger control over privately-owned forests. Expropriation of private forests is not regarded as feasible, but stronger state control over privately-owned forest land is recommended. The latter is desirable especially in Saxony, where private forests are numerous, and only 173 out of a total of 67,030 private forest holdings exceed 250 acres in size.—*Joseph S. Illick.*

1025. KRAUCH, HERMANN. Alinement volume tables. Jour. Forestry 18: 831-832. 1 fig. 1920.—The method of preparing alinement volume charts and the use of a volume table prepared in this manner is described. Alinement charts make possible a rapid transcription of volume data with less chance for error.—*E. N. Munns.*

1026. KRESS, OTTO, C. J. HUMPHREY, AND C. AUDREY RICHARDS. Guarding against fungi in wood and wood pulp. Paper 26¹⁰⁻¹²: 13-15, 21-22, 23-25. 11 fig. 1920.—Characteristics and qualities of papers made from sound wood or wood pulp as compared with that from

decayed material are discussed, as well as methods of infection, differences in appearance of, effects of, and methods of controlling, molds and wood-destroying fungi.—*H. N. Lee.*

1027. MAHOOD, S. A., AND D. E. CABLE. Decay of woodpulp. Paper 25²⁴: 11-12. 1920.—A chemical investigation of sound and infected ground wood pulp.—*H. N. Lee.*

1028. MARTIN. Die Fortbildung des Sächsischen Forsteinrichtungsverfahrens. [Development of the Saxon method of forest organization.] Tharander Forst. Jahrb. 71: 30-57, 72-89. 1920.—The final 4 chapters of a serial on forest organization in Saxony. The results and conclusions of 100 years of consistent and continuous development along the same line of organization are set forth. The determination of felling and management methods are discussed under the following headings: Choice of species, stand establishment, stand form, stand development, stand improvement, and soil treatment. The theory and practice of forest rent is discussed. The need for revision and control of organization plans is emphasized, the importance of regulating the entire business of forest organization is set forth, and the desirability of an effective coördination of forest administration, silviculture, forest investigation, and forest organization is stressed.—*Joseph S. Illick.*

1029. MARTIN. Das Verhalten von Kiefern-Buchen-Mischbeständen in ökonomischer Hinsicht, mit besonderer Rücksicht auf die forstlichen Verhältnisse Sachsens. [Mixed stands of Scotch pine and beech in Saxony.] Tharander Forst. Jahrb. 71: 269-282. 1920. [To be continued.]—Data collected to date show that pure stands of Norway spruce surpassed mixed stands of beech and Scotch pine in volume and value production. There are other determining factors which should be considered. The author believes that there are numerous areas, aggregating a large acreage, between the good hard wood soil and the poor pine soil well adapted to the production of mixed stands of Scotch pine and beech.—*Joseph S. Illick.*

1030. MOUNT, H. A. In the modern sawmill. Sci. Amer. 123: 548, 557. 4 fig. 1920.—Machines and methods by which the cutting up of logs is put on a basis of extreme economy.—*Chas. H. Otis.*

1031. MUNGER, T. T. Second remeasurement of permanent sample plots of Douglas fir on the west slope of the Cascades in Oregon. Jour. Forestry 18: 833-836. 1920.—On sample plots in Douglas fir it is found that there has been a loss of 41 trees per acre in 10 years, with an increase in diameter for the stand of from 13.7 to 16.3 inches, the basal area increasing from 200 to 224 square feet. The annual increment in cubic feet has fallen from 188 in the 1st 5 years to 80 in the 2nd, or from 1259 board feet in the 1st to 828 in the 2nd 5 years. The average cubic-foot volume of the trees in 1910 was 45; in 1915, 54; and in 1920, 66.—*E. N. Munns.*

1032. MUNNS, E. N. Chaparral cover, run-off, and erosion. Jour. Forestry 18: 806-814. 1920.—A severe fire in 1919 destroyed some 150,000 acres of brush cover in southern California. Erosion was very severe following this fire and destroyed much of the engineering work designed to prevent floods. On eroded areas a small stand of annuals and perennials came up from dormant seeds, which were present in much greater numbers on unburned lands. The soil of slightly eroded areas contained seeds of almost as many species and individuals as did the soil in non-burned and non-eroded areas.—*E. N. Munns.*

1033. MUNNS, E. N. High temperatures and eucalyptus. Jour. Forestry 19: 25-33. 1921.—High temperatures in southern California caused "burning" of trees, due largely to extreme droughty conditions. The amount of injury depended upon the abundance of water or the character of the soil. Trees on loamy soils suffered least. *Eucalyptus rostrata* and *E. terreticornis* of all the planted eucalypts withstood the droughty conditions best.—*E. N. Munns.*

1034. PEARSON, G. A. **Brush disposal in western yellow pine.** Jour. Forestry 19: 36-38. 1921.—Studies have been made since 1908 on methods of brush disposal. Sheep damage is prevented by piling the brush and logs together, though heavy brush hinders germination because of depth of litter. With no grazing in such places the grass grows very heavily and root competition is very keen. Where the brush is piled and burned seedlings do best, but because of the succulent vegetation sheep damage is very severe. When protected from grazing growth is exceedingly rapid. Protection from wind and sun is favorable, but detrimental if at the expense of soil-moisture loss by competition with other plants. Under controlled grazing, piling and burning give best results but methods are insignificant when compared with grazing.—*E. N. Munns.*

1035. PELLETER, WALDEMAR. **Wiederbesiedlung und Forstwirtschaft.** [Colonization and forestry.] Oesterreich. Forst- u. Jagdzeitg. 38: 30-31. 1920.—Following the war there has been a strong movement in Austria back to the land, encouraged by colonization laws that tend to break up large estates. This movement is closely interrelated with forestry, since in many cases it will result in the clearing of forested lands for farms. Many such lands have been under cultivation in the past but have been abandoned after the fertility of the forest humus became exhausted. The lands have reverted to forest and have been bought up in large blocks and placed under forest management. This new movement will decrease the area of such forests and will break up their unity to such an extent that economical management and logging will be very difficult, if not impossible. The interests of forestry must be protected for the good of the state and in some places for the good of these colonization schemes themselves, as in certain valleys the existence of farms will depend upon the possibility of the owner finding an occupation to supplement his farming. A permanent forest industry alone can furnish this supplementary occupation.—*F. S. Baker.*

1036. PILlichODY, A. **Ein Erlenkopfhholzbestand.** [Alder coppice.] Schweiz. Zeitschr. Forstw. 71: 289-290. 1 pl. 1920.—Alder coppice is not as common as willow (*Salix alba*), especially in the Rhone River bottom. At Epende there are about 4 hectares with stumps 10 to 15 meters apart. The stumps are knotty, partly decayed, hollow, and up to .80 meter in diameter, 1.5-2 meters high, and 70-80 years old. This coppice is on a clay soil and is very productive. Each stump supports 6-8 prominent sprouts that provide fuel wood in 10-15 years. The yield averages 150 cubic meters with an annual increment of 10-12 cubic meters.—*J. V. Hofmann.*

1037. RECORD, S. J. **From wood to cloth.** Sci. Amer. 123: 591, 601-602. 4 fig. 1920.

1038. RILEY, SMITH. **A national game policy.** Jour. Forestry 18: 767-774. 1920.—A plea is made for the adoption of a national game policy which would call for adequate game protection in order not only to provide hunting but to provide material for active observations of the haunts and activities of wild animals generally.—*E. N. Munns.*

1039. RUBNER, K. **Die waldbaulichen Folgerungen des Urwaldes.** [The conclusions which forest culture derives from the virgin forest.] Naturw. Zeitschr. Forst- u. Landw. 18: 201-213. 1920.—It is shown that the cultural forest is not to be considered as primarily unnatural, as is often thought, and that the composition of the virgin forest is not what it is commonly supposed to be. The virgin forests may be pure or extremely mixed; the character is directly dependent upon the climatic and edaphic conditions, and the ability of the various species to adapt themselves. The virgin forest is not typically selection, but more nearly a shelterwood forest. Much is to be learned regarding the value of humus in reproduction, and it is not to be considered that natural regeneration under the virgin forest develops the ideal conditions. It is admitted that clear-cutting, with all its faults, has helped considerably to perpetuate the forests and the more valuable species in Germany.—*J. Roeser.*

1040. S., W. **Waldschutz.** [Forest protection.] Oesterreich Forst- u. Jagdzeitg. 38: 53-54. 1920.—A reply to an article of same title by H. SAMMEREYER (see Bot. Absts. 4,

Entry 463). A wave of forest destruction is at present sweeping over the entire world. This destruction threatens to make wildernesses of many regions as it has made a desert of the Sahara in the past, while it also tends to arrest the purification of the air, which is one of the functions of the forest. Present forest areas should not be reduced. In Austria the futility of clearing forest land for permanent agriculture is shown by the fact that many such lands have been cultivated in the past but have been allowed to revert to forest when the fertility of the forest humus was exhausted and the productivity fell too low for economical handling for agriculture. Grazing in forests is incompatible with silviculture and must be stopped. The first requisite in securing forest protection is a world-wide educational campaign through schools, clubs, the press, etc., to develop a deeper regard for the forests and secure a more general recognition of their economic indispensability in any progressive state.—*F. S. Baker.*

1041. SEIBERT, FLORENCE B., AND JESSIE E. MINOR. *The differentiation of sulphite pulps.* Paper 25¹: 17–20. 7 fig. 1920.—A description of a method using a combination of malachite green and Congo red to show very accurately the presence or absence of lignocellulose.—*H. N. Lee.*

1042. SEILER, HANS. *Die Holznot in Kärnten.* [The wood famine in Carinthia.] *Allg. Forst- u. Jagdzeitg.* 38: 67–68. 1920.—The lack of firewood in the cities was particularly marked in Carinthia during the winter of 1919. This was due to many causes, the chief ones being general insufficiency of supplies of all kinds, the rising stumpage prices which have encouraged small owners to hold their timber, and the depletion of the war when great quantities of the most accessible fire-wood were cut to supply the army. Organization of wood producers and dealers, the construction of roads, tramways, etc., and purchase of forest land by municipalities, associations, and the like, is urged as the best means of escaping repetitions of such a famine.—*F. S. Baker.*

1043. TUBEUF, C. VON. *Verschiedenes Verhalten gegen Windströmung.* [Different responses to air currents.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 186–187. 1920.—Tubeuf refers to an illustrated paper under this title in *Schweiz. Zeitschr. Forstw.* 71: 177–179. 1920 (see Bot. Absts. 7, Entry 813) by A. PILlichODY. The photograph in the latter's paper shows a row of broad crowned Canadian poplars, which have grown up sloping in the direction of the valley wind, and a row of Italian pyramid poplars (evidently Lombardy poplars) which have grown straight, to all appearances unaffected by the wind-movement. The local custom of trimming, which leaves but a small broomlike crown on the latter, and a wide-spreading crown tip on the former, accentuates the different effects produced by the wind-movement. The two trees are briefly compared as to their cultural desirability.—*J. Roesser.*

1044. VIDAL, Y. L. *Micrography of sycamore pulp.* Paper 27³: 18–19. 1920. [Translation from *La Papeterie* 62: 434–439. Fig. 1. 1920.]—The yield of pulp and possibilities for paper making are discussed. The dimensions of the elements and the histology of the vessels are given in detail.—*H. N. Lee.*

1045. WATSON, RUSSELL. *Forest descriptions on the forest survey of the Groton State Forest, Vermont.* *Jour. Forestry* 19: 43–50. 1921.—On the Groton Forest greater detail was needed than was obtained by using the standard forest description forms. A detailed questionnaire was built up to give data on the stand and the characteristics of the area, noting the silvical conditions as to planting, thinning, and final cutting.—*E. N. Munns.*

1046. WEIDMAN, ROBERT H. *The windfall problem in the Klamath region, Oregon.* *Jour. Forestry* 18: 837–843. 1920.—Heavy windfall losses occur annually throughout the north Pacific Coast. It has been found that the windfall losses, on cut-over land especially, are heaviest during the first years following cutting; as the trees become wind-firm the losses gradually decrease. In the virgin forest the loss from year to year is more or less constant except for exceptional heavy winds occasioning very heavy losses at infrequent intervals. Apparently neither quality of tree nor of site enables the trees to withstand these storms; and trees of all crown characters appear to suffer equally.—*E. N. Munns.*

1047. WHITE, DAVID G. **Standardization of lumber sizes and grades.** Jour. Forestry 19: 34-35. 1921.—The American Lumber Congress is supporting a proposed change in the manufacture of lumber. At the present time there is no standardization of grades in woods or in building materials. It is proposed to reduce the number of grades of finish materials and to unify the nomenclature of defects in structural woods.—*E. N. Munns.*

1048. WICKENDEN, H. R. **A sketch on Swedish forestry from an American standpoint.** Jour. Forestry 18: 775-791. 1920.—A general description is given of the organization of the Swedish forest service with some of its regulations and forest practices. The general subject of forestry in Sweden is very similar to that in America, though the former country has proceeded much farther toward forest management. Rotation varies from 80 to 150 years, depending upon climatic conditions, with clear cutting usually employed, except upon special areas where protection is needed. In these situations a selection system is used. Thinnings are made frequently but up to the present have been very slight, the tendency being toward heavier thinnings, especially in the crown. Logging is done chiefly during times of snow and the hauling is done by sleighs. The average saw log is between 14 and 19 feet long and from 7 to 9 inches in diameter. The logs are taken from the mill and driven down streams, which have been very greatly improved. Forest planting is carried on extensively through sowing in seed spots. Local seed has been proved superior to foreign seed. The tendency generally is for a shorter rotation and for volume production rather than quality. A constant increase in the price of lumber is expected at the rate of 2 per cent a year.—*E. N. Munns.*

1049. WISLICENUS, H. VON. **Das pflanzenchemische Institut der Sächsischen Forstakademie und forstlichen Versuchsanstalt zu Tharandt und die Pflege der Pflanzenchemie im allgemeinen, der stofflichen Holzforschung im besonderen.** [Plant chemistry institute and forest experiment station at Tharandt, Saxony.] Tharander Forst. Jahrb. 71: 90-106. 1920.—An academic discussion of the place of plant chemistry in a forest school curriculum and a consideration of the distinct fields covered by industrial research institutes and laboratories connected with educational institutions. The urgent need for a fuller and better knowledge of the chemistry of forest products was brought to full light during the war. Forest products laboratories are a real and urgent need. Timber impregnation, seasoning of wood, and turpentine yield are among the problems considered.—*Joseph S. Illick.*

1050. WOODBRIDGE, R. G., JR. **Nitrocellulose from wood pulp.** Paper 267: 136-146. 1920.

1051. WOOLSEY, THEODORE S., JR. **The development of a brush-disposal policy for the yellow pine forests of the southwest.** Jour. Forestry 19: 39-42. 1921.—Notes are made on the brush-disposal policy in the southwest to the effect that brush burning is better than fire lines, which are generally impracticable as desired in the district. Where possible these lines should be located on ridges rather than in the canyons or on the slopes.—*E. N. Munns.*

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 769, 789, 796, 808, 809, 815, 819, 896, 1137, 1141, 1145, 1161, 1209, 1212, 1322, 1388, 1574)

1052. ADKINSON, JUNE. **The behavior of bronchial asthma as an inherited character.** Genetics 5: 363-418. 39 fig. 1920.—In a study of 400 cases of bronchial asthma, author found that 48 per cent gave a history of the occurrence of the disease in other members of the family. Asthmatics found sensitive to the cutaneous tests, more frequently give a family history positive for asthma than do the patients found non-sensitive to the cutaneous tests, but such histories do not furnish conclusions as to the cause, severity, prognosis or treatment in any given case. The tendency to hay-fever, asthma or allied condition is transmitted,

not the condition itself.—Thirty-eight family histories are analyzed with a more or less complete record of 91 matings in which parents or offspring were asthmatic or had hay-fever. In 4 matings where both parents were asthmatic, there were 9 asthmatic offspring, and 1 normal who transmitted asthma. In 34 cases, with one parent asthmatic and the other normal, but with positive family history, there were 60 asthmatic offspring, and 67 normal. In 17 matings, with one parent asthmatic and the other normal, with negative family history, there were 60 normal offspring. Where both parents were normal in 32 cases, with positive family histories, theoretically $\frac{1}{4}$ would be asthmatic, and $\frac{3}{4}$ normal, but in this series there were 3 times as many asthmatics as normal, there being 45 asthmatics and 15 normal.—Upon this data the writer concludes that bronchial asthma is inherited as a Mendelian trait recessive to the normal condition. In those asthmatics with one parent asthmatic and the other apparently normal, it is necessary to assume that the latter is simplex. The appearance of asthma in direct line in succeeding generations can be explained only on the supposition that for each generation, in the mating of the asthmatic and the new strain, the latter, though apparently normal, must in every instance carry asthma in the simplex condition in the germ-plasm (heterozygous). Those asthmatics with negative history are explained as duplex in respect to the character, the tendency being transmitted through several generations by antecedents who were themselves simplex.—Robert A. Cooke.

1053. ALVERDES, FRIEDRICH. Über das Manifestwerden der ererbten Anlage einer Abnormität. [On the manifestation of a hereditary primordium of an abnormality.] Biol. Zentralbl. 40: 473-480. 1920.—Abnormalities in structure of rudimentary 5th and 6th pairs of legs occurred (mostly in male individuals) in 1 pure line of *Cyclops viridis* but not in the control line, or, with one exception, in wild stock. Inheritance of abnormality is quite irregular. Sometimes normal parents produce abnormals, and abnormal parents frequently produce very few abnormals. Percentage of abnormals is always fairly low. Abnormality is very variable in its character; it is frequently marked on one side of an individual while other side is entirely normal. Author attributes results to inheritance of a more than normal lability of the primordium of the 5th and 6th pairs of legs.—A. M. Banta.

1054. ANCEL, P. Sur l'hermaphroditisme glandulaire. [On glandular hermaphroditism.] Compt. Rend. Soc. Biol. 83: 1642-1644. 1920.—Six pigs studied were hermaphrodite in that both glands were mixed, or one was true ovary, other was mixed or a testis. In mixed glands, the upper part was testicular, the lower ovarian. Wolffian duct persisted only on side where there was a testis or mixed gland. Uterus was well developed in all of them, but Fallopian tube was well developed only on side next to true ovary. Observations are held to support view that genital glands are normally hermaphrodite, with only one part developed. Author believes persistence of Wolffian duct, often observed in female, is due to presence of hermaphrodite gland or testis.—A. Franklin Shull.

1055. ANONYMOUS. Berichtigung. [A correction.] Zeitschr. Indukt. Abstamm. u. Vererb. 20: 295. 1919.—In NACHSTEIN, N. Die Analyse der Ergfactoren bei *Drosophila* und deren zytologischen Grundlage. Zeitschr. Indukt. Abstamm.- u. Vererb. 20: 118-156. 1919, the labeling of figure 2, page 133, should be interchanged as follows: In the F_1 generation the word "rotäugig" should read "weissäugig" and in the F_2 generation the word "rotäugig" at the right should read "weissäugig."—J. L. Collins.

1056. ANONYMOUS. Better dairying by bull associations. Joint use of good sires improves herds. Jour. Heredity 10: 135. Mar., 1919.—A quotation from a News Letter of the U. S. Department of Agriculture. The advantage of coöperative bull associations are discussed briefly.—Sewall Wright.

1057. ANONYMOUS. Variation, selection and mutation in one of the protozoa. Jour. Heredity 10: 143. Mar., 1919.—Review of work of MIDDLETON and JENNINGS and of R. W. HEGNER, which indicates that heritably diverse strains may be selected out from a single vegetatively reproduced organism,—in this case *Arcella dentata*.—J. H. Beaumont.

1058. ANTHONY, R. D. *Asexual inheritance in the violet (Viola odorata)*. New York Agric. Exp. Sta. [Geneva] Tech. Bull. 76. 55 p., charts 1-10. 1920.—A study was made of the possibility of changing, through a series of selections, stem length and yield of the double violet, Marie Louise (*Viola odorata*), in order to throw light on the problem of bud selection in pome fruits. Eight hundred plants of this variety, the previous histories of which were unknown, were used as parent plants. Selections were made from these for long stem high yield, long stem low yield, short stem high yield, and short stem low yield, each year. Methods of selecting, corrections for vigor, and corrections for variations due to positions in the house are considered in detail. At the end of 5 years 4 groups had been isolated. Yield for each group was as follows: Long stem high yield, 36.484 ± 0.505 ; long stem low yield, 34.637 ± 0.572 ; short stem high yield, 40.359 ± 0.569 ; short stem low yield, 35.389 ± 0.515 . Yield is expressed in number of normal flowers. Stem length in each group is as follows: Long stem high yield, 8.920 ± 0.029 ; short stem high yield, 8.537 ± 0.040 ; long stem low yield, 8.483 ± 0.043 ; short stem low yield, 8.537 ± 0.043 . The unit of length was the half inch. All of the plants in each of the 4 groups traced back to a single one of 4 of the original 800 plants. "It follows then that we seemingly have proved only the existence of asexually inherited differences which probably were present before the experiment was begun."—W. D. Valleau.

1059. BARKER, E. EUGENE. *El mejoramiento de nuestras siembras por la selección*. [The improvement of our crops by means of selection.] Estacion Exp. Insular Puerto Rico Circ. 30. 24 p. 1920.—Popular account. No new methods presented.—E. E. Barker.

1060. BONNET, L. O. *Some observations concerning pollination of olives*. Fig and Olive Jour. 4¹²: 4. 1920.—Author discusses a one-season study made 20 years ago at Pomona, which indicated that some olive varieties are fully self-fertile and others more or less self-sterile.—Howard B. Frost.

1061. BOULENGER, M. F. *L'hérédité morbide*. [Inheritance of disease.] Scalpel 73: 669-676. 1920.

1062. BOUMAN, K. HERMAN. *Anthropologische Feststellungen über die Amsterdamer Schulbevölkerung*. [Anthropological discoveries on the school population of Amsterdam.] Nederlandsch. Tidschr. Geneesk. 64: 2374-2383. 1920.

1063. BRIDGES, CALVIN B. *The developmental stages at which mutations occur in the germ tract*. Proc. Soc. Exp. Biol. Med. 17: 1-2. 1919.—Study of critical cases among mutants and mosaics of *Drosophila melanogaster* has shown that mutation occurred (1) at or near maturation stages in most cases, (2) some time prior to maturation in few cases, (3) during early segmentation stage in few cases, and (4) in zygote immediately after fertilization in some cases (mosaics).—C. W. Metz.

1064. BURCH, D. S. *Harnessing heredity to improve the Nation's live stock*. U. S. Dept. Agric. Year Book 1919: 347-354. 3 fig. 1919.—The advantages to be expected from the use of pure-bred sires in livestock breedings are discussed in connection with the campaign sponsored jointly by the U. S. Department of Agriculture and a majority of the States for "Better Sires—Better Stock."—Sewall Wright.

1065. COMBY, J. *La tache bleue mongolique chez les enfants européens*. [The blue Mongolian spot on European children.] Arch. Med. Enfants 23: 321-337. 1920.

1066. CORRENS, C. *Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtiger Pflanzen*. [Sex tendency of germ-cells in plants of mixed sex.] Zeitschr. Bot. 12: 49-60. 2 fig. 1920.—Protonema were obtained by the regeneration from cells of the wall and the stalk of antheridia and archegonia in the monoecious moss *Funaria hygrometrica* which again produced normal male and female branches. Since such cells are near sister cells of sperms and eggs it is considered that sperms and eggs also possess maleness and femaleness as equal

potencies. Evidence is summarized that sex differentiation in monoecious and hermaphrodite flowering plants is likewise independent of special genetic determiners of sex, that here maleness and femaleness resides equally in the most differentiated of sex organs, and that sex differentiation is here purely a phenotypic development.—A. B. Stout.

1067. CORRENS, C. Individuen und Individualstoffe. [Individuals and individual substances.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 65-66. 1919.

1068. CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. III. *Veronica gentianoides albocincta*. IV. Die *albomarmorata*- und *albopulverea*-Sippen. V. *Mercurialis annua versicolor* und *xantha*. [Genetical studies with variegated races. III. *Veronica gentianoides albocincta*. IV. The *albomarmorata* and *albopulverea* races. V. *Mercurialis annua versicolor* and *xantha*.] Sitzungsber. Preuss. Akad. Wiss. Berlin 6, 7: 212-240. 1920.—III. *Veronica gentianoides albocincta*. This race of *Veronica* appears to be a case of a real white-margined type of variegation. It is self-sterile. When crossed with normal green plants (*typica*) nothing but green plants appeared in F_1 and F_2 , indicating no inheritance of this variegated character. IV. *Albomarmorata* and *albopulverea* races. Both show a white-green spotting or mosaic that is inherited similarly. The spotting of *albopulverea* is much finer than that of *albomarmorata*. 1. *Ipomoea imperialis chlorina* and *albomarmorata*. The following types were isolated from commercial seed and their genetic constitution determined: a. Normal green (*typica homogenea*), *CCNNHH*. b. Pale green (*chlorina homogenea*), *CCnnHH*. c. White-spotted green (*typica albomarmorata*), *CCNNhh*. d. White-spotted pale green (*chlorina albomarmorata*), *CCnnhh*. Factor *C* produces the *chlorina* pigment; factor *N* changes *chlorina* to normal green; and factor *H* produces solid leaf color as contrasted with the spotted condition. The latter factor is inherited independently of *C* and *N*. 2. *Tropaeolum majus chlorinum* and *albopulvereum*. These 2 races of *Tropaeolum* are similar to those of *Ipomoea* noted above. The *chlorinum* type is given the genetic formula *CCnnHH* and the *albopulvereum* type, either *CCNNhh* (*typica*) or *CCnnhh* (*chlorina*). V. *Mercurialis annua versicolor* and *xantha*. The *versicolor* race produces seedlings that begin with yellow leaves which later become green permitting the plant to survive. This character is found to be a simple Mendelian recessive to normal green. In the *xantha* race the seedlings are yellow and remain so, the plant eventually dying. Duplicate factors are concerned in the inheritance, giving both 15:1 and 3:1 ratios of green to yellow seedlings.—E. W. Lindstrom.

1069. COSTANTIN, J. Physiologie de l'anthocyane et chimie de la chlorophylle. [Physiology of anthocyan and chemistry of chlorophyll.] Ann. Sci. Nat. Bot. X, 1: xxxviii-lii. 1919.—See Bot. Absts. 7, Entry 411.

1070. COWGILL, H. B. Cross-pollination of sugar cane. Sugar 21: 580-581. 1919.—Methods used in cross-pollination of sugar cane.—C. W. Edgerton.

1071. DAVENPORT, C. B. Influence of the male on the production of twins. Med. Rec. 1920: 1-10. 1920.—“About 1 per cent of all human births are plural births.” Some mothers have more than one pair of twins and may be called “repeaters.” Such women may be considered to have a constitutional “ovarial structure that readily permits double ovulation,” and such structure is conceivably inheritable. Among the “close relatives of repeating mothers” it is found that “the ratio of twin production rises to 4.5 per cent.” But also among the close relatives of fathers of twins it is found that the incidence of twins is as high as 4.2 per cent, hence “the paternal inheritance is real and nearly as potent as the maternal. The problem is to account for this paternal influence. Double ovulation is not universal in women but “is far commoner, proportionately, than twin births.” A study of pregnant swine shows that the number of corpora lutea exceeds the number of embryos and the latter exceed the number of births. Fetuses die at all stages from no apparent cause but inherent weakness. These facts are apparent in human pregnancies.—Geneticists now recognize “lethal factors,” transmitted according to the laws of heredity, “which brought in by one or

both parental germ-cells, inevitably prevent full development." Besides it must be recognized that there is probably a frequent failure of fertilization of the egg, even when conditions would seem to be propitious. From these considerations it is clear that the father as well as the mother may "determine whether both of a pair of simultaneously ovulated eggs shall be fertilized, and whether or not they shall receive lethal factors." There follow comments on uniovular twins and a plea for more complete and accurate observational data by obstetricians.—*Howard J. Banker.*

1072. DEANE, W., AND M. L. FERNALD. A new albino raspberry. *Rhodora* 22: 112. 1920.—A new amber-white or honey-colored raspberry was found by Mr. ROBERT A. WARE on Caribou Mountains, Maine, in 1919. This is a variant of *Rubus idaeus* var. *canadensis*, and should be called *Rubus idaeus* L. var. *canadensis* Richardson, forma *Warei*. The New England "white"-fruited raspberry already known is a form of *Rubus idaeus* var. *strigosus*. [See also Bot. Absts. 7, Entry 1432.]-*Francena R. Meyer.*

1073. DICKSON, M. E. Elements of higher fecundity. *Michigan Acad. Sci. Ann. Rept.* 21: 145-146. 1919.—Fecundity in fowls is limited chiefly by vitality of individual. Breeding for egg production does not increase vitality. It may even cause decrease of vigor, thereby defeating its purpose. In such cases out-crossing is used to restore vigor and hence to increase production. In selecting for vigor, criteria are size of fowl, early maturity, and rapidity of feathering and moulting. Variety of fowl is of little importance except that meat-producing breeds are to be avoided, evidence of this conclusion coming from egg-laying contests in several states. Environment and general management are more important than breed, since many breeds are about equally productive.—*A. Franklin Skull.*

1074. DONCASTER, L. Note on an experiment dealing with mutation in bacteria. *Proc. Cambridge Phil. Soc.* 19: 269. 1919.—It was noticed that the recorded ratio of occurrences in cases of meningitis of the 4 agglutination-types of *Meningococcus* correspond very closely with the ratio of occurrence of the 4 iso-agglutinin groups of blood in a normal human population.—It seemed possible, therefore, that by growing *Meningococcus* of one type in media containing human blood of different groups, mutation to other types might be induced. Experiment showed that considerable differences in type of agglutination resulted, but it was concluded that this was caused by sorting out of races of different agglutinability from a mass culture rather than by true mutation.—*L. Doncaster.*

1075. FEHLINGER, H. Rassenmässige Variation der Körpergrösse beim Menschen. [Racial variations of body size in man.] *Aus der Natur* 16: 212-215. 1920.

1076. FRUWIRTH, C. Beiträge zu den Grundlagen der Züchtung einiger landwirtschaftlicher Kulturpflanzen. V. Gräser. [Contributions to the fundamental principles of cultivation of several agricultural plants. V. Grasses.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 169-178. 1920.—The present paper supplements a previous article of the author appearing in Vol. 14, 1916, of this publication. He describes further experiments in cross and self-fertilization, and concludes, in general, that among the grasses sterility predominates in self-fertilization and that it is possible to find entire vegetative issues which produce no fruit; then again, that individuality is present, and that individuals and often entire vegetative offspring can be singled out, which produce an appreciable, often plentiful, crop of fruit, as a result of self-fertilization. In the cultural practice, the production of seed by self-fertilization will be more or less difficult, for the probability of securing fruit is not strong, and much of the fruit will be sterile.—*J. Roeser.*

1077. GARBER, R. J. A preliminary note on the inheritance of rust resistance in oats. *Jour. Amer. Soc. Agron.* 13: 41-44. 1921.—Author finds evidence of a single hereditary factor-difference with respect to the rust reaction of the host plants used as parents. Resistance apparently behaves as a dominant character in the crosses made.—*F. M. Schertz.*

1078. GASSER, G. W. Report of the work at Rampart Station. Rept. Alaska Agric. Exp. Sta. 1917: 34-57. Pl. 3, 4. 1919.—Results are given of field tests of varieties, crosses, and pure-line strains of farm and horticultural crops.—[See Bot. Absts. 7, Entry 26.]—*Fred Griffiee*.

1079. GLEASON, H. A. [Rev. of: GAGER, C. STUART. Heredity and evolution in plants. 14×20 cm., xi + 265 p., 113 fig. P. Blakiston's Sons & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672).] *Torrey* 21: 14-16. Jan.-Feb., 1921.

1080. GOLDSCHMIDT, RICHARD. Untersuchungen zur Entwicklungsphysiologie des Flügel-musters der Schmetterlinge. I. Mitteilung. Einige Vorstudien. [Investigations of the physiology of the development of the color pattern of the wings in butterflies. I. Some preliminary studies.] *Arch. Entwicklungsmech.* 47: 1-24. 12 fig. 1920.—This investigation is incidental to author's main work concerning heredity in Lepidoptera. Species used are: *Samia cecropia*, *Telea polyphemus*, *Hyperchirio io*, *Callosamia promethca*, and *Anisota stigma*. Investigations were conducted in the Osborn Zoological Laboratory, Yale University, in 1914-18.—The author points out that blood sinuses develop about tracheae and precede formation of veins. These are centers of chemical processes making for color. Pattern is independent of origin of color and complete before color sets in. Main plan of pattern is due to differential growth of wing surfaces following quickly after development of veins and scales, visible first as irregularities of wing surface, indentations, folds, pits, corners, etc., into which later color is, as it were, poured in. Characteristics of folds, depressions, etc., are due to rigidity of veins, pressure of body upon growing wing, folds in wing membrane in pupal case, etc.—Author suggests various collateral subjects for investigation.—*Isabel McCracken*.

1081. GOLDSCHMIDT, RICHARD. Intersexualität und Gesschlechtsbestimmung. [Intersexuality and sex-determination.] *Biol. Centralbl.* 39: 498-512. 1919.—Chief results of an investigation regarding intersexuality and sex-determination are set forth pending publication of a complete account of the work. The results are founded upon breeding 75,000 individuals of the gypsy moth, *Lymantria dispar* L., involving several varieties. [See next following entry.]—*Isabel McCracken*.

1082. GOLDSCHMIDT, RICHARD. Untersuchungen über Intersexualität. [Investigations on intersexuality.] *Zeitschr. Indukt. Abstamm. u. Vererb.* 23: 1-199. 2 pl., 84 fig. 1920.—Results are given from rearing about 75,000 individuals of different races of gypsy moth, which are named according to locality: 5 from Germany, 1 from South Europe, 10 from Japan, 1 from Massachusetts. Normal sexes differ in wings (form and color), antennae, abdomen (shape, size, hairiness), gonads, external genitalia, and instincts (flying, mating). Egg plasma or Y chromosome bears a factor, *F*, for female characters which is inherited unchanged in maternal line and is balanced against factor *M* for male characters, which is carried by X chromosome. In pure stock of different races *FMm* is normal female and *FMM* is normal male, for *F* is stronger than 1 dose of *M* and weaker than 2 doses in determining type of development. *F* and *M* differ in strength in different races as shown by crosses. In development of a "genetic" male, *MM* from weak race may be weaker than *F* from strong race. The latter will predominate after a certain "turning point" in development of a particular structure, which from that point on develops as in male. Similarly a "genetic" female, *F* (weak) *M* (strong) *m*, may have "turning point" after which she develops as male. The greater the difference in "strength" of parental races, the earlier this "turning point," and the higher the grade of intersexuality. Last organs to develop in the embryology are the first to be affected. Organs which have a homologue in the other sex develop up to "turning point" as in "genetic" sex and then may dedifferentiate and continue as in the opposite sex. Strong chitinization hinders dedifferentiation. Other organs develop abnormally after "turning point." Instincts become intersexual. Color is determined very late in pupal stage and hence, in "chief type" of female intersexuality, except in those of very low grade, intersexes resemble males. "Gifu type" of female intersexuality and male intersexuality are alike in being streaked with color of opposite sex in greater or less amount according to grade.

Arrangement of streaks apparently depends upon chance, but amount depends upon time remaining after turning point for protein-splitting, color-forming enzymes to act. In streaked type of intersexuality color spreads out from veins, but in "chief type" of female intersexuality from zigzag lines. This difference is not explained. Other differences of color depend upon character of races entering into cross. Mutation *lunata*, which causes zigzag lines to drop out, can be bred pure, and combined with various types of intersexuality. Hormone secretions for sex and secondary sexual characters are probably the same, are produced in each cell, and not in gonads as in vertebrates. Cytology throws no light upon conditions as X and Y are indistinguishable and no difference appears between races. Attempt is made to correlate strength of races with character of environment. Female intersexuality is produced when females of weak races are crossed with males of strong races, giving *F* (weak *M* (strong) *m*). There is but 1 grade of intersexuality from a particular type of cross except for slight overlapping in plus and minus directions. Grades, depending upon races used, are grouped as follows: (a) Beginning: These show some females grading to normal. All are fertile and hence valuable for genetic work. (b) Weak: These are of "Gifu type," always sterile. (c) Medium: Among others are "Aomori type," with large abdomen filled with unused nourishment; embryonal ovaries; hairiness and form of male. (d) Strong: Some are of "chief type," some of "Gifu" according to parentage. (e) Highest grade: These are sterile but grade into (f). (f) Complete "sex-turnabout:" These are apparently normal males, except that a few grade into (e) and there are 9 perfectly normal females to 2187 males. These "extra females" are explained by non-disjunction of sex-chromosomes. Many F_2 and back-cross results are given to corroborate theory of female intersexuality. Intersexual males are usually produced when strong female is crossed with weak male. Fukuoka females by Hokkaido males produce normal females and males varying from apparently normal up to strongly intersexual. Only minus individuals are fertile. (Fukuoka *F*, Hokkaido *M*, *m*) is normal female. (Fukuoka *F*, Fukuoka *M*, Hokkaido *M*) is intersexual male. In later generations it is found that (Fukuoka *F*, Hokkaido *M*, Hokkaido *M*) is female, complete "sex-turnabout." A very few incomplete observations show that after crossing of 2 weak races there may appear male intersexuality. Occurrence of a few "extra males" in crosses where all males should be turned into females is explained by non-disjunction as in case of "extra females."—*P. W. Whiting*.

1083. GOWEN, J. W. Report of progress on animal husbandry investigations in 1919. Maine Agric. Exp. Sta. Bull. 283. 249-284. 7 fig. 1919.—Logarithmic equations have been determined for yearly yield in milk of the 3 dairy breeds, Holstein-Friesians, Guernseys, and Jerseys. All 3 breeds reach their maximum milk yield when from 8 to 10 years of age.—Sons of various sires have been examined with respect to the sons' ability to transmit high or low milking qualities to their daughters.—A high correlation was found to exist between the milk yield for any 1 lactation period and the average for the first 5. A high correlation also exists between milk production during a 7-day period and the yield during the whole lactation period which either includes the 7 day period or is the one following. On the other hand very little correlation exists between conformation as judged by the score card and milk production.—*H. L. Ibsen*.

1084. GRIER, N. M. Notes on variation in chicory. Amer. Midland Nat. 6: 148-149. 1919.—Brief note on variation in the number of flowers and involucre bracts of plants of *Cichorium Intybus* growing wild in the Shenandoah Valley, with suggestion that this plant may well be utilized in the laboratory study of variation for classes in biology.—*A. B. Stout*.

1085. GUNDERSEN, ALFRED. [Rev. of: SMALL, JAMES. The origin and development of the Compositae. 344 p., 40 fig. New Phytologist Reprint No. 11. London, 1919.] Torreya 20: 125-126. 1 fig. Nov.-Dec., 1920.

1086. HANLY, J. Mendelism and the laws of heredity. Jour. Dept. Agric. Ireland 20: 460-467. 2 fig. 1920.—Popular account and some modern applications.—*D. Folsom*.

1087. HARRIS, J. ARTHUR, AND C. S. SCOFIELD. **Permanence of differences in the plots of an experimental field.** Jour. Agric. Res. 20: 335-356. 1920.—The fact is generally recognized that heterogeneity is a source of error in experimental field tests. The purpose of the writers is to show whether the differences among experimental plots are permanent or whether they are transitory and are smoothed out by cultivation. Interannual correlations are used as a means of measuring the relative permanency of the differences.—Published data are reviewed for yields of paddy on 17 plots of ranges "B" and "C" of the wet tract of the Experimental Farm at Hebbel, Mysore. The correlation between yields of the same plots for 1905 and 1906 is for range "B" $+ 0.834 \pm 0.050$ and for range "C" $+ 0.799 \pm 0.059$. Correlations for yields of ragi on 105 plots of the dry-land experiments of the Mysore state for the years 1905 and 1906, 1905 and 1907, and 1906 and 1907, are $+ 0.758 \pm 0.028$, $+ 0.852 \pm 0.018$, and $+ 0.610 \pm 0.041$, respectively. Correlations are calculated for yields of corn on the same plots in the years 1895, 1896, and 1897, at the Illinois Experiment Station. Yields of corn in the unfavorable year 1895 correlated with yields of the same plots for the favorable years 1896 and 1897 are $- 0.354 \pm 0.054$ and $- 0.221 \pm 0.059$, respectively. Yields for the two favorable years 1896 and 1897 show a correlation of $+ 0.818 \pm 0.020$.—Data were taken from the records of the Field Station of the Office of Western Irrigation Agriculture at Huntley, Montana. Yields were used from 46 plots in a uniform cropping experiment covering the period 1909 to 1919 inclusive. The crops involved in the rotation were sugar beets, alfalfa, corn for grain, oats, corn for silage, and barley. In some cases the plots were subdivided into half and quarter plots. Correlations are calculated between yields of the same plots for different years. Of the 152 correlations calculated for whole plots, 133 are positive and 19 are negative. The average value of the positive correlations is $+ 0.3346$ as compared with $- 0.1475$ for the negative correlations. For the 152 constants the average value is $+ 0.2743$.—The data from half and quarter plots substantiate the results for whole plots. The results show conclusively that in general plots which yield more in one year will yield more in other years.—Some evidence is given to show the effect of the yield of a particular crop in the rotation upon the yields of subsequent crops. Plots giving high yields of sugar beets in 1911 showed low yields of alfalfa in 1912. Alfalfa exerted a definite residual influence upon subsequent crops. The effect was not fully shown until the 2nd year after the alfalfa field was plowed, and decreased until little if any effect was shown in the 4th year. Due to the residual effect of alfalfa and its early introduction into the rotation it is impossible to determine to what extent the correlations between the yields of alfalfa and the yields of other crops are due to the variation from plot to plot of the amount of nitrogen fixed by the alfalfa and to what extent due to the original heterogeneity of the experimental plots.—*Fred Griffiee.*

1088. HENSEN, V. **Die Mutation und was sie über die Entstehung neuer Arten lehrt.** [Mutation and what it teaches about the origin of new species.] Schrift. Naturwiss. Ver. Schleswig-Holstein [Kiel] 17: 1-12. 2 fig. 1920.

1089. HENSEN, V. **Der Vorgang bei der Mutation.** [The process in mutation.] Schrift. Naturwiss. Ver. Schleswig-Holstein [Kiel] 17: 190-191. 1920.

1090. HONING, J. A. **Erfelijkheidsleer zonder Evolutie theoriën.** Rede uitgesproken bij de aanvaarding van het Hoogleeraarsambt aan de Landbouwhoogeschool te Wageningen 23 Nov. 1920. [Genetics vs. theories of evolution. Lecture given on assuming the office of Professor at the Agricultural High School of Wageningen, Nov. 23, 1920.] H. Veenman: Wageningen, 1920.

1091. HONING, J. A. **Selectie-Proeven met Deli-Tabak.** [Selection studies with Deli tobacco.] Teysmannia 30: 1-11. 2 pl. 1919.—To increase production without extending acreage, strains may be sought which produce a large number of leaves per plant. For cigar wrapper-leaf, however, quality is more important than quantity production, hence high leaf number is not given first consideration in selection work. Most types of high leaf number are hybrids which continue to segregate indefinitely. Wrapper leaf should be of sufficient

length and breadth, also ratio of width to length is of some importance. In selection work types with leaves in which width is less than 60 per cent of length are rejected. Leaves 11 to 15, counting from base of plant, were measured. Leaf with broad base is better than one with narrow base. Leaf should be thin but strong, supple, elastic. Light colors are much desired and fallow (vaal) shades are preferred over brown. Red colors are very undesirable. Color and other qualities are affected by soil, weather, and fertilizer, and tobacco harvested in early morning cures a purer fallow (valer) than when harvested later in day. Hence, precautions are required in testing inheritance of color. It appears from extensive tests repeated on different estates that color and fineness of tobacco are hereditary characteristics of the various selections. Results of rigorous comparisons made in 1916 and 1917 with a light-colored and a fallow-colored line, showing percentage yields of the different colors for the leaves on lower half of the plant, are given in tables. On higher-lying soil regularly producing darker tobacco the light-colored strain proved decidedly advantageous while on low lands reddish and spangled colors were obtained in unfavorable weather. Conversely, the fallow line gave better colors on the low lands but a darker product on upland soil. Plants have not yet been found fulfilling the ideal of (1) many leaves; (2) long leaves; (3) broad leaves; (4) broad leaf base; (5) short internodes; (6) thin; (7) strong; (8) supple; (9) light color; (10) tan shade; (11) good burn. "Light line" 1, however, is deficient only as to (1) and (10). Light fallow line 72 produces more leaves and a truer fallow shade than the preceding but has less desirable shape of leaf and longer internodes. [See also following entry.]-W. W. Garner.

1092. HONING, J. A. *Selectie-Proeven met Deli-Tabak III.* [Selection experiments with Deli tobacco.] Mededeel. Deli Proefsta. Medan (Sumatra) 2 (no. 6): 25. 1919.—In continuation of previous work (Mededeel. Deli Proefsta. 10: 79-128 and 2d ser., no. 2, 84) critical studies were carried forward with selections, originally obtained from commercial plantings and again propagated in 1918, mainly as to color and length of the fermented leaves taken from the lower half of the plant. In 1918 a total of 357 test plots of 800-1200 plants each, representing 54 lines, with mixed seed as controls, were grown on 12 different estates. With the more promising lines large-scale trials also were made, in some cases more than a million plants being grown. Detailed tabulated data are presented for 13 lines in comparison with mixed seed from which each line was derived, based on 3 primary color grades, with the customary commercial subdivisions of color shades, and the length of leaf. In some instances statistical tables of number of leaves per plant are included. In general, the results of comparisons in 1918 between the selections and mixed seed from which they were derived are in good agreement with those of 1917, showing that the differences in color and length of leaf are hereditary. Some of the selections proved to be segregating hybrids with respect to number of leaves produced. [See also preceding entry.]-W. W. Garner.

1093. HOWARD ALBERT, AND G. L. C. HOWARD. *Some labour saving devices in plant-breeding.* Agric. Jour. India 15: 5-10. Pl. 1. 1920.—For the prevention of crossing, parchment bags are not suitable in India on account of high temperature and high humidity. Cylindrical muslin covers gave better results with this work. For variety trials a large netted drying house is used, and sheet iron metal cans are used for storing seed which have previously been dried.—J. J. Skinner.

1094. HUMPHREY, SETH K. *The racial prospect.* 261 p. Charles Scribner's Sons: New York, 1920.—As stated in the sub-title, this is a "rewriting and expansion of the author's book 'Mankind.' " It is in fact a revised edition of the former work presenting the same fundamental ideas expanded rather than materially modified by the outcome of the war. The racial heritage of the ages accumulated through natural selection tends to be dissipated by civilization; for civilization preserves the defectives and permits their propagation while the best stock becomes increasingly infertile. There follows an inventory of the racial values preserved in the leading nations. Hybridism of extremely diverse races, as in America, is disastrous to the higher race. The struggle for racial dominance lies

between the English-speaking and the German peoples and will be determined by the conservation of the superior stock in the racial heritage. "The deeper current of human affairs knows nothing of the ripples which so constantly fill our excited vision; it runs silently past the hours of the day to meet the centuries, carrying the racially strong through all accidents of war and peace to ultimate world domination." To meet this situation and to counteract the natural tendencies of civilization, Humphreys conceives a nation-wide conscription and registration of all defectives, the segregation of the incompetent in "farm community centres," and the enforced sterilization of "border-liners." But the cutting off of the defective germ-plasm is not sufficient. The infertility of the superior stock would still lead to the dead level of a mediocre race. To meet the need of propagating from the superior breed, a "new motherhood" is conceived. By scientific methods it is considered "possible to gain a distinguished father for one's children as impersonally as one would take inspiration from his books," and thereby the superior celibate womanhood of the race becomes the preserver of the "great inheritance of mankind."—*Howard J. Banker.*

1095. KLEBAHN, H. *Impfversuche mit Pfropfbastarden.* [Infection experiments with graft hybrids.] *Flora* 11/12: 418-430. 1918.—Tomato is readily susceptible to disease caused by *Septoria lycopersici* and *Cladosporium fulvum*. The black nightshade, *Solanum nigrum*, is resistant to both of these. In this investigation an effort was made to determine the resistance of various graft hybrids of tomato with the black nightshade to these fungi.—Results of infection experiments on the following chimeras, using *Septoria lycopersici*, are given: *Solanum tubigense*—the outer epidermis is tomato tissue while all the inner tissues are black nightshade. Plant is resistant. *Solanum proteus*—2 outer layers of cells are tomato tissue. Considerable infection was obtained. *Solanum Koelreuterianum*—epidermis, nightshade; interior, tomato tissue. Infection was obtained. *Solanum Gaertnerianum*—2 outer layers, nightshade; interior, tomato. Both positive and negative results were obtained with infection trials. *Solanum Darwinianum*—epidermis, nightshade; center, nightshade; an intervening area, tomato. Infection was obtained. Experiments with *Cladosporium fulvum* were unsatisfactory and will be repeated.—*C. L. Porter.*

1096. KNIEP, H. [German rev. of: COLLINS, E. J. Sex segregation in the Bryophyta. *Jour. Genetics* 8: 139-146. *Pl. 6, 5 fig.* June, 1919 (see Bot. Absts. 3, Entry 2103; 5, Entry 1635).] *Zeitschr. Bot.* 12: 685-686. 1920.

1097. LENZ. [German rev. of: NOORDEN, C. VON, UND S. KAMINER. *Krankheiten und Ehe.* Darstellung der Beziehungen zwischen Gesundheitsstörungen und Ehegemeinschaft (Diseases and wedlock. The relation between ill health and marriage.) 1111 p. Thieme: Leipzig, 1916.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 208-221. 1918.

1098. LENZ, FRITZ. Oskar Hertwigs Angriff gegen den "Darwinismus" und die Rassenhygiene. [Oskar Hertwig's attack on Darwinism and race hygiene.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 194-203. 1920.—This is a criticism of Hertwig's whole attitude towards Darwinism and race hygiene, and is directed in particular at his recent pamphlet, "Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus" (Jena, 1918). It is claimed that Hertwig has misconstrued both Darwinism and Lamarckism, and that he has drawn a caricature of race hygiene and the selection theory. His own theory,—a form of determinism depending on a structure and organization of matter by virtue of some inherent "force,"—is held to be philosophically untenable and smacking of the materialistic metaphysics of the 19th century. In the field of ethics, moral value is, according to Hertwig, the directing force; but Lenz maintains with KANT and other philosophers that moral force is outside the world of experience, and that a natural theory which has for its object the laws of "being and becoming," has no application to the principles of values, nor, therefore, of ethics.—*L. J. Cole.*

1099. LIPSCHÜTZ, A. Bemerkung zur Arbeit von Knud Sand über experimentellen Hermaphroditismus. [Comment on the work of Knud Sand on experimental hermaphroditism.]

Pflüger's Arch. 176: 112. 1919.—Referring to similar work by KNUD SAND on rats, the author points out that he had earlier demonstrated transformation of clitoris into penis-like organ in female guinea-pigs, into which testes had been grafted in place of ovaries.—A. Franklin Skull.

1100. LITTLE, C. C. Is the fertile tortoise-shell tom cat a modified female? Jour. Genetics 10: 301-302. 1920.—Author points out superiority of his non-disjunction hypothesis to DONCASTER's theory of hormone action during embryonic life as an explanation for the production of, and also for the sterility or fertility of, tortoise-shell tom cats.—H. L. Ibsen.

1101. MACBRIDE, E. W. The method of evolution. Scientia 28: 23-33. 1920.—A vigorous attack on the 'mutation theory' of evolution. Since the majority of mutations are recessive in character, and result in 'cripples,' "it seems obvious" to the author "that interesting as the appearance of inheritable potentialities of the mutations are they have nothing to do with the evolution of species and that mutations have not furnished the material for the historical evolution of plants and animals." The Lamarckian doctrine of heritable changes, and consequently of evolution, occurring as the result of use and disuse, in response to needs brought about by environmental change, is then wholeheartedly espoused. The author feels that the experimental work of KAMMERER has not been properly evaluated nor accorded fair treatment by 'Mendelians.' Finally, he stigmatizes as the 'Weismannian nightmare' the idea of a 'germ-plasm' distinct from 'somatoplasm.'—L. J. Cole.

1102. MALAQUIN, A. Reproduction sexuée et reproduction asexuée. [Sexual and asexual reproduction.] Compt. Rend. Acad. Sci. Paris 171: 1403-1406. 1920.—In the annelid family Serpulidae, *Salmacina Dysteri* (Huxley) has sexual and asexual forms which have developed under apparently the same conditions. In 772 individuals there were 93 sexual hemaphrodites, 245 divided or preparing to divide asexually, and 434 unclassified. At the season of sexual activity in the sexually reproducing forms the asexual animals show an increase in size of sex glands and functional activity to almost the normal condition.—D. F. Jones.

1103. METZ, CHARLES W., AND JOSÉ F. NONIDÉZ. Spermatogenesis in the fly, *Asilus sericeus* Say. Jour. Exp. Zool. 32: 165-185. 2 pl. 1921.—The spermatogonial chromosomes are 10 in number, arranged in 5 pairs; the sex chromosomes have not been identified. The paired association of chromosomes is retained up to and through the final spermatogonial division. Synapsis is effected in telophase at the beginning of the growth period by the intimate association of chromosomes that were already paired in anaphase, and the union effected at this time persists throughout the succeeding growth period. No leptotene or zygotene stages, in the usual sense, could be found. Tetrad structures are not visible. The 1st maturation division appears to be reductional for all the chromosomes.—Bertram G. Smith.

1104. NACHTSHEIM. [German rev. of: ARMBRUSTER, LUDWIG. Bienenzüchtungskunde. Versuch der Anwendung wissenschaftlicher Vererbungslehren auf die Züchtung eines Nutztieres. (The art of breeding bees. An experiment in the application of scientific genetics to the breeding of a domestic animal.) 22 fig. Th. Fisher: Leipzig and Berlin, 1919.] Biol. Centralbl. 40: 575-576. 1920.

1105. NOACK, KONRAD. [German rev. of: CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. I. *Capsella bursa-pastoris* albovariabilis und chlorina. (Genetical studies with variegated races. I. *Capsella bursa-pastoris* albovariabilis and chlorina.) Sitzungsber. K. Akad. Wiss. Wien 34: 585-610. 1919 (see Bot. Absts. 4, Entry 551).] Zeitschr. Bot. 12: 675-678. 1920.

1106. NOACK, KONRAD. [German rev. of: CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. II. Vier neue Typen bunter Periklinalchimären. (Genetical studies with variegated races. II. Four new types of variegated periclinal chimeras.) Sitzungsber. K. Akad. Wiss. Wien 44: 820-857. 1919 (see Bot. Absts. 4, Entry 550).] Zeitschr. Bot. 12: 678-680. 1920.

1107. NOACK, KONRAD. [German rev. of: STOMPS, THEO J. Über zwei Typen von Weissrandbunt bei *Oenothera biennis* L. (On two types of white margins in *Oenothera biennis*.) Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 261-274. 1920 (see Bot. Absts. 8, Entry 1211).] Zeitschr. Bot. 12: 680-682. 1920.

1108. NONIDEZ, JOSÉ F. The internal phenomena of reproduction in *Drosophila*. Biol. Bull. 39: 207-230. 10 fig. 1920.—In spite of the large amount of genetic work with *Drosophila*, heretofore there has been available no description of the morphology and physiology of the internal reproductive organs of the species. This deficiency, which is of considerable importance to those interested in hybridizing experiments, is supplied in the well illustrated description here given. Two points of importance in addition to the purely morphological features are the demonstration that the spermatozoa are retained for several days after copulation in both the spermathecae and the median ventral receptacle, and the suggestion that the spermatozoa are activated by the secretion of the parovaria, certain accessory glands connected with the uterus.—H. H. Plough.

1109. PEARSON, KARL. Notes on the theory of correlation. Biometrika 13: 23-45. 3 fig. 1920.—Pearson traces the early development of the theory of correlation and corrects his earlier "errors of ascription" by giving to GALTON the whole credit of discovering the correlation calculus. The work of GAUSS and of BRAVAIS on the probability curve and the theory of errors is shown to have had a bearing only upon determining the position of indirectly observed points from observed independent variables, mainly in geodesy and astronomy, and although Bravais reached the correlation surface he had not the idea of correlation. Pearson then reviews Galton's early papers on correlation, presents 3 of his figures, and outlines the development and interpretation of his measures of the coefficient of regression. WELDON's papers on correlation in shrimps and crabs, and EDGEWORTH's on "Correlated averages" are briefly reviewed to show that they added almost nothing to the theory.—Henry E. Niles.

1110. RENNER, O. [German rev. of: (1) VRIES, HUGO DE. Mass mutations and twin hybrids of *Oenothera grandiflora* Ait. Bot. Gaz. 65: 377-422. May, 1918 (see Bot. Absts. 1, Entry 219). (2) VRIES, HUGO DE. Phylogenetische und gruppenweise Artbildung. (Phylogenetic and group-wise species formation.) Flora 11-12 (Festschr. E. Stahl): 208-226. 1918 (see Bot. Absts. 5, Entry 349).] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 175-178. Sept., 1920.

1111. RICHET, C., ET H. CARDOT. Mutations brusques dans la formation d'une nouvelle race microbienne. [Sudden mutations in the formation of a new race of microbes.] Compt. Rend. Acad. Sci. Paris 168: 657-663. 1919.—Four months' daily observation of a pure lactic ferment organism in an arsenical medium showed that its essential function,—the formation of lactic acid,—was so developed as to suggest a new race. The formation of this race was not gradual, but sudden; and its developed functions remained stable, not only on the medium in which development took place, but also on other media.—Andrew I. Dawson.

1112. RIDDLE, O., AND H. A. CARR. Posthumous works of Charles Otis Whitman. Carnegie Inst. Washington Publ. 257. Vol. 1. $x + 194$ p., 88 pl., 36 fig.; Vol. 2. $x + 224$ p., 39 pl., 11 fig.; Vol. 3. $xi + 161$ p. 1919.—Volume I. The derivation of bars, as shown by *Columbia livia* and domestic races of pigeons, from checks and these in turn from a common avian character, constitutes the main thesis of this volume. This character still persisting in pigeons and other birds, is well preserved in the oriental turtle dove of China. It also occurs in the juvenile plumage of modern pigeons. The check mark of so-called checkers was derived by an apical splitting of the check of the turtle dove until only two spots remained, on the inner and outer vanes respectively, of the feather. By a further modification of these checks bars were derived. Therefore Whitman considers the checker the *affinis* type and the barred the *livia* type. By selection experiments the author was able to reduce the number of checks to 4 bars and then to 3, and so on until a pure gray wing resulted. The process

was, however, irreversible. Whitman concludes that the same law of orthogenesis holds for various other orders of birds. In the latter part of the volume there are 2 chapters on "Fundamental bars and frills" and "The mutation theory and mutations." In the latter, 3 mutations occurring in Whitman's stocks are described.—Volume II contains data relating to many close and wide crosses between doves and pigeons. The main deductions are as follows: The wider the cross the lower the fertility and the greater the tendency for the production of males; fertility is lowest in the autumn with an excess of females and highest in the spring with an excess of males. The stronger germs are produced early and give rise to males, while the later germs are weaker and produce females. Color follows the same law. The appearance of white and certain abnormalities are signs of weakness. There is also a discussion and a presentation of data relating to sex-linkage. About two-thirds of Volume III deals with the behavior relating to reproduction, such as sexual activities, nesting, egg-laying, onset of incubation, and feeding of young. These are discussed in some detail and then related to the variations of different species and the sexes. The other third of the volume is taken up with miscellaneous subjects. The voices of different species are discussed. Certain elements of the voice of the turtle dove are noted in those of the common pigeon. Voices of hybrids are blended. Various other acts of behavior peculiar to pigeons, such as homing, tumbling, and pouting, are considered.—*Sarah V.H. Jones.*

1113. RIXFORD, G. P. Some results of fig breeding by the U. S. Dept. of Agr. *Fig and Olive Jour.* 4th: 12, 13. 1920.—"Fertile seeds can be secured from all kinds of common figs." A branch with pistillate figs about 1-2 cm. in diameter is bagged with a caprifig fruit containing mature *Blastophaga*, and the pollination is left to the insects. Figs containing fertile seeds may differ from unpollinated fruits in size, shape, and time of ripening. Hybrids between varieties of the Adriatic class and caprifigs of the Smyrna class are about half caprifigs [staminate]. Several promising seedlings are described.—*Howard B. Frost.*

1114. ROMMEL, GEO. M. Essentials of animal breeding. U. S. Dept. Agric. Farmers' Bull. 1167. 38 p., 32 fig. 1920.—The basic facts about heredity and the breeding of farm animals together with the principles to be followed in livestock improvement are discussed in this bulletin, in popular language.—*Sewall Wright.*

1115. S., E. J. [Rev. of: GAGER, C. STUART. *Heredity and evolution in plants.* 14 × 20 cm., xi + 265 p., 113 fig. P. Blakiston's Son & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672).] *Sci. Prog.* [London] 15: 498. 1921.

1116. SANDO, CHARLES E., AND H. H. BARTLETT. Rutin, the flavone pigment of *Escholtzia californica* Cham. *Jour. Biol. Chem.* 41: 495-501. Pl. 6-7. April, 1920.—"The petals of *Escholtzia californica* contain nearly 5 per cent of rutin (quercetin glucosorhamnoside). In view of the great range of (flower) colors in *Escholtzia*, from golden yellow to white, and from white to rose, this genus would appear to afford especially suitable material for study of the physiological and genetic relationships of the flavonol and anthocyanin pigments."—*Leonas L. Burlingame.*

1117. SCHULTZ, WALTHER. Kälteschwärzung eines Säugetieres und ihre allgemeinbiologischen Hinweise. [Blackening by means of cold in a mammal and its general biological implications.] *Arch. Entwickl. mech.* 47: 43-75. 12 fig. 1920.—Author made experiments on rabbits with pink eyes, white body, and black ears, nose, tail, and feet, to determine the influence of heat and cold on coat color. He was able to change the white color into black and to produce diverse types of hair-color patterns, through the influence of cold. The nature and cause of arctic white and black animals is also discussed.—*John H. Schaffner.*

1118. SEMON, RICHARD. Über das Schlagwort "Lamarckismus." [On the catch word "Lamarckism."] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 22: 51-52. Dec., 1919.—Author refers to criticisms of H. SIEMENS regarding an article by the author on "The footprint of man," published 5 years ago. Siemens has referred to the article as a Lamarckian expla-

nation and therefore incapable of accounting for phylogenesis. The author replies, however, that no such inference can be drawn and that he has always warned against confusing the catchword "Lamarckism" with the phenomena of somatic inheritance, the interpretation of which can be placed upon a purely physiological basis.—*M. A. Jull.*

1119. SHAFFER, E. L. A comparative study of the chromosomes of *Lachnosterna* (Coleoptera). Biol. Bull. [Woods Hole] 38: 83-103. 1920.—The diploid chromosome groups of 4 species of *Lachnosterna* (namely, *delata*, *fusca*, *gracilis*, and *tristis*), as well as *Pelidnota punctata* and *Cotalpa lanigera*, show 20 chromosomes, 1 pair of which is composed of 2 unequal elements (sex chromosomes). There are no essential differences in the form and arrangement of the chromosomes in the species studied. Cyst formation in the testis begins by a rapid division of a single primary spermatogonium, so that all the cells within any particular cyst are the descendants of a single cell. The visible polarity of the cell seems to be established at the time of cyst formation. The growth period of the spermatocytes is marked by the appearance of delicate leptotene threads which are derived from the chromosomes of the last spermatogonial division; these threads become polarized and there is evidence that they are arranged in pairs parasynaptically. There is a definite contraction phase. The sex chromosomes persist through the entire growth period in the form of compact bodies, sometimes being contained within chromosomal vesicles. The unequal sex elements separate in the 1st maturation division and divide equationally in the 2nd maturation division. In the 1st maturation division there are 5 atelomitic tetrads and 5 telomitic tetrads, the latter including the sex pair.—*Bertram G. Smith.*

1120. SLYE, MAUD. The relation of inbreeding to tumor production: studies in the incidence and inheritability of spontaneous tumors in mice. Jour. Cancer Res. 1920.—Author states that it is impossible to prove inheritability of any character without inbreeding. Inbreeding reveals what is in a strain, nothing is "increased" or "intensified." Pedigrees are given to show that inbreeding does not increase the incidence of cancer unless selection of the cancer-bearing strains in a mixed population is made.—It is concluded that consistent inbreeding eliminates any strain, and that inbreeding within a cancer strain speedily eliminates the strain and instead of increasing cancer, as some have inferred, it eliminates cancer. Hybridization increases cancer by increasing the output of cancer progeny. Cancer behaves as a recessive. [See Bot. Absts. 7, Entry 1727.].—*C. C. Little.*

1121. STOMPS, THEO. J. Über zwei Typen von Weissrandbunt bei *Oenothera biennis* L. [On two types of white variegation in *Oenothera biennis* L.] Zeitschr. Indukt. Abstamm.-u. Vererb. 22: 261-274. 1920.—Author presents data bearing upon the heredity, in *Oe. biennis* L., of 2 types of white variegation, as well as evidence for the appearance of these types by mutation, their perpetuation by latent, semi-active, or active genes, and their expression as phenomena of vegetative splitting. The works of CORRENS, BEYERINCK, GREGORY, BAUR, and KÜSTER are discussed at length. In the 1st type of variegation vegetative mutation occurs in the periclinally dividing apical cell producing (1) green twigs and (2) twigs with white-margined leaves. Selfed seed from green twigs give green, from variegated twigs white, and the cross, variegated \times green, a vegetative splitting into white and green cell complexes, in the F_1 . The latter are piebald variegated identical with types which have arisen by mutation from pure green *Oe. biennis* \times *Oe. biennis cruciata*. In either case such plants are produced by the union of a "green" germ-cell with one mutated to "white." The results of selfing green, nearly green, variegated, and strongly variegated twigs of the piebald-variegated plants warrant the conclusion that each cell complex has reached a definitive condition which may be transmitted to its offspring. The following types fall in the piebald variegated class: *Mirabilis jalapa albomaculata* and *Arabis pallida pseudoleucodermis*, studied by Correns, *Pelargonium zonale albomarginatum* and *Antirrhinum majus albomaculatum*, by Baur, and an *albomaculata* type of *Primula sinensis* reported by Gregory. In all of these types the chlorophyll factor is carried over in a perlabile condition. In *Mirabilis jalapa*, reciprocal crosses, *albomaculata* \times normal green, Correns and Baur report con-

flicting results, Correns finding strict matrocliny and Baur the production of piebald variegated plants as well as white and green. The mutation coefficient, "green" to "white," is 0.01 per cent, such mutations probably occurring in the somatic cells before the flower appears. Three methods are possible, (1) vegetative mutation, (2) mutation in the gametes, and (3) the appearance of variegation as an intermediate character between 2 races. The latter possibility is illustrated by the author's 2nd type of variegation. A plant of this type appeared by mutation in 1918. Selfed green twigs, variegated twigs, the cross, variegated \times green, and the cross, variegated \times a constant *chlorina* type from *Oe. suaveolens* \times *Oe. Hookeri*, all gave green progeny, the latter heterozygous for a chlorophyll factor. This type constitutes an intermediate race. Its characters in so far as they may be called specific are designated by the writer as "taxonomic anomalies."—Corren's hypothesis that white variegation is due to a disease condition is summarily dismissed and the alternative hypothesis of a special condition of the gene for the development of chlorophyll for each cell complex, advanced. The white sub-epidermal layer in Corren's *Arabis pallida pseudoleucodermis*, for instance, appears as the expression of a semi-latent gene for normal green pigment.—In closing the author says, "*La vérité est en marche; rien ne l'arrêtera.*" [See also Bot. Absts. 8, Entry 1107.]-Paul A. Warren.

1122. TISCHLER, G. [German rev. of: FLORIN, RUDOLF. *Zur Kenntnis der Fertilität und partiellen Sterilität des Pollens bei Apfel und Birnensorten.* (On the fertility and partial sterility of the pollen of different varieties of apples and pears.) *Acta Horti Bergiani* 7: 1-39. 1920 (see Bot. Absts. 5, Entry 1503).] *Zeitschr. Bot.* 12: 687-688. 1920.

1123. VAN DENBURGH, JOHN. A further study of variation in the gopher snakes of western North America. *Proc. California Acad. Sci.* 10: 1-27. 2 pl. 1920.—A study of the variations of number of gastroteges, dorsal color pattern blotches, and scale rows has revealed the existence of 7 geographical races of the western North American gopher snakes, *Pituophis*. On the basis of number of gastroteges 2 subspecies were formerly recognized. Those having the lower number, *P. cantenifer cantenifer*, occur in the cool northern coast and adjacent interior regions extending to middle California. The number of gastroteges increases in the southern regions where is found *P. c. annectens*. Within these subspecies geographic variation in color pattern exists, the coast forms having a higher number of blotches than the interior forms; *P. c. heermanni* is the northern interior form having fewer color blotches than the coast form of the same latitude. The same distinction is found between coast and interior forms of the southern group. The interior form here is designated *P. c. deserticola*. The number of scale rows also shows geographical variation permitting a further subdivision. The northern and southern divisions named above fall into 2 groups while the snakes of Lower California, Utah (*rutilis*), and Arizona (*stejnegeri*) form 3 different groups, the latter 2 being subspecies, that of Lower California a true species, *P. vertebralis*. The author has thus divided 3 groups into 7 on the basis of geographic variation of at least 3 characters. A key for the identification of the 7 groups is given.—J. L. Collins.

1124. VRIES, EVA DE. Versuche über die Frucht- und Samenbildung bei Artkreuzungen in der Gattung *Primula*. [Study on fruit and seed formation in species crosses of the genus *Primula*.] *Rec. Trav. Bot. Néerland.* 16: 63-205. 1919.—Study in detail on seed and fruit formation in species crosses between *Primula acaulis*, *P. Sibthorpii*, *P. elatior*, *P. Juliae*, *P. Auricula*, and *P. hirsuta* with special reference to self and cross-pollination as related to heterostylism. Short-style \times short-style and long-style \times long-style represent illegitimate unions in author's classification, while long-style \times short-style and its reciprocal are designated legitimate. Illegitimate unions are of two kinds—those from selfing and those derived from crossing plants of either the same or of different species, but with the same type of style. When protected against insects, there is no self-pollination in *P. acaulis*. In profuse-flowering stocks of *P. elatior*, spontaneous selfing takes place in short-style, but very rarely in long-style plants. Artificial self-pollination in case of *P. acaulis* and *P. elatior* give different results with the two style types. Long-style *P. acaulis* gave about 25 per cent fruits as

against less than 1 per cent fruit in short-style selfings (159 pollinations gave one fruit). Fruits in both cases have good seed. Results in *P. elatior* somewhat similar. Illegitimate pollinations of long-style *P. acaulis* \times long-style *P. elatior* gave no results. Illegitimate pollinations of *P. Sibthorpii* \times *P. elatior* and of *P. Auricula* gave only negative results. Legitimate unions in *P. acaulis*, *P. acaulis* \times *P. Sibthorpii*, and reciprocals fruit readily and seed is similar in all in number, size, and weight. F_1 *P. acaulis* \times *P. Sibthorpii* is fertile and crosses back with either parent. Legitimate unions of *P. acaulis* \times *P. elatior* are more difficult to secure than legitimate unions between plants of *P. acaulis*, but less difficult than illegitimate unions. Fruit and seed in general are very small and seed weight at most half that of seed of pure species. Reciprocal (*P. elatior* \times *P. acaulis*) in legitimate cross-pollination sets fruits readily and gives 50–60 per cent very large seed, and remainder very light. Legitimate cross-pollination of *P. acaulis* by *P. Juliae* produces fruit as readily as legitimate unions in *P. acaulis*, but seeds, though equal in number, are lighter and smaller. F_1 hybrids are fertile. F_1 back-crossed with parents in legitimate unions gave seed as large and numerous as in *P. acaulis*. *P. elatior* fruits readily in legitimate cross-pollination. Legitimate cross-pollination of *P. elatior* by *P. Sibthorpii* gives results similar to *P. elatior* \times *P. acaulis*. Reciprocal crosses (12) gave only one fruit with very small seeds. Long-style *P. elatior* \times *P. Juliae* short-style, fruited and seeded as readily as pure *P. elatior* in legitimate unions. F_1 hybrids are fertile in legitimate unions. Both style-forms of *P. Auricula* in legitimate unions set fruit readily. Legitimate crosses of *P. Auricula* by *P. hirsuta* and reciprocal set easily. Legitimate crosses between plants of *P. hirsuta* are fertile. Seeds of *P. Auricula*, *P. hirsuta* and their hybrids from legitimate unions are indistinguishable. Literature on the subject is reviewed.—Orland E. White.

1125. WHITE, WILLIAM A. [Rev. of: KNIGHT, M. M., IVA, L. PETERS, AND PHYLLIS BLANCHARD. *Taboo and genetics*. 301 p. Moffat, Yard and Co.: New York, 1920.] *Mental Hygiene* 5: 194–195. 1921.

1126. WRIGHT, SEWALL. The relative importance of heredity and environment in determining the piebald pattern of guinea-pigs. *Proc. Nation. Acad. Sci. [U. S.]* 6: 320–332. 6 fig. June, 1920.—Correlation between parents and offspring was found to be $+0.211 \pm 0.015$ for random-bred stock with piebald pattern, while it was found to be only $+0.014 \pm 0.022$ for stock inbred for many generations. Variability in inbred stock is thought to be due almost entirely to irregularity in development. By biometrical methods it has been determined that for the random-bred stock "variations in pattern are determined about 42 per cent by heredity, and 58 per cent by irregularity in development, leaving nothing for tangible environmental factors. In the inbred family the corresponding figures are 3 per cent for heredity, 5 per cent for tangible environment, and 92 per cent for irregularity in development."—H. L. Ibsen.

1127. YAMPOLSKY, CECIL. Sex intergradation in the flowers of *Mercurialis annua*. *Amer. Jour. Bot.* 7: 95–100. 1 pl. Mar., 1920.—Typical flowers for male, female, and monoecious forms in this species are described, and various grades of hermaphrodite flowers are described and figured for both female and monoecious forms. These develop in various grades of maleness along with complete femaleness, or in various gradations in the proportion of the two, with in many cases no loss of functioning power of the organs formed. "Most elaborate and varied transition stages appeared of stamens into pistils and of pistils into stamens." "Intergradations within the flowers may occur by steps that are almost insensible." A periodic alteration of sex is reported for monoecious plants.—It is pointed out that a factorial hypothesis of sex determination does not explain these results; that no definite factor determines the sex of a flower, but that sex is here an epigenetic condition.—A. B. Stout.

HORTICULTURE

J. H. GOURLEY, *Editor*H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 771, 838, 866, 888, 915, 1058, 1060, 1078, 1087, 1113, 1122, 1346, 1388, 1396, 1420, 1446, 1457, 1499, 1513, 1523, 1525)

FRUIT AND GENERAL HORTICULTURE

1128. ALBERT, C. Utilisation des serres sans chauffage au charbon, ni fumier. [Utilization of greenhouses without heat from coal or manure.] *Revue Hort.* 92: 166-167. 1920.

1129. ANONYMOUS. Grafting of walnut trees. *Amer. Nut Jour.* 10: 12. 1919.—Discussion by members of the Western Walnut Growers Association. When grafting is done low down on the ground the graft will start and then die. Hence better results are obtained from trees grafted some distance above the ground. It was found that fine crops may be obtained when the grafting is carried out 12 feet above the surface of the ground.—*E. L. Overholser.*

1130. ANONYMOUS. Making lime-sulphur at home. *British Columbia Dept. Agric. Circ. New Hort. Ser.* 61. 5 p. 1920.

1131. ANONYMOUS. [Rev. of: GOULD, H. P. *Peach-growing.* xxi + 426 p. The Macmillan Co.: New York, 1918.] *Sci. Prog.* [London] 15: 147. 1920.

1132. ANONYMOUS. [Rev. of: HEDRICK, U. P. *Manual of American grape-growing.* xiii + 458 p. The Macmillan Co.: New York, 1919.] *Sci. Prog.* [London] 15: 147-148. 1920.

1133. BIOLETTI, T. FREDERIC. Propagation of vines. *Univ. California Agric. Exp. Sta. Circ.* 225. 4 p. 1920.—Directions for the propagation of vines are discussed under the following heads: (1) Choice of cuttings; the best wood for cuttings is of medium size and with moderately short joints. (2) Time of making cuttings; best to make the cuttings as soon as possible after the vines are pruned. (3) Method of making cuttings; cuttings $\frac{1}{2}$ – $\frac{3}{4}$ inch in diameter are best and not more than 1 inch at the butt or less than $\frac{1}{4}$ inch at the top; the shorter the better, providing they can be made to root. (4) Care of cuttings; discussion of methods of handling cuttings. (5) Planting of cuttings, including field practices. (6) Digging and care of rooted vines.—*A. R. C. Haas.*

1134. BONVALLET, E. Radis noir Poids d'horloge, sa culture. [The culture of the black radish, Poids d'horloge.] *Revue Hort.* 92: 164. *Fig.* 57. 1920.—This is one of the best winter radishes of commercial importance. It requires careful selection to maintain it at a high standard of quality. The seeds are planted from the end of May to the end of July.—*E. J. Kraus.*

1135. BULLARD, W. P. National Pecan Growers' Exchange. *Amer. Nut Jour.* 10: 55-56. 1919.—The co-operation marketing of this exchange has centralized control, efficiently standardized grade and brand, and has stabilized market. Distribution has been effected with scientific precision, and the speculator's net profit becomes distributed to the growers as extra profit.—*E. L. Overholser.*

1136. BURNS, W. The top-working of Indian fruit trees. *Agric. Jour. India* 15: 516. 1920.

1137. CHEVALIER, AUG. Sur les variations de bourgeons des arbres et arbustes cultivés comme de décadence des variétés anciennes. [On bud-variations of trees and cultivated shrubs as a cause of the degeneration of old varieties.] *Compt. Rend. Acad. Sci. Paris* 171:

1011-1014. 1920.—It is contended that bud-variations are the cause of varieties "running out." Examples are given from the citrus fruits as well as from the apple, pear, olive, and cherry. Mention is also made of *Myrtus communis* and *Acer negundo* var. *folis argentic variegatus*. It is therefore concluded that sexual reproduction at intervals is advisable in horticultural varieties.—*C. H. Farr*.

1138. CONDIT, I. J. **The fig in the Sacramento valley.** Monthly Bull. Dept. Agric. California 8: 591-595. 1919.—The following are the 4 varieties of figs chiefly grown commercially in California: Mission, Adriatic, Smyrna, and Kadota. The Smyrna, although of better quality than the Adriatic, is more exacting as regards climate and soil requirements, and although yielding a better dried product is not as good a shipper as the Kadota. For Sacramento valley the author recommends the Black Mission, which is an excellent variety for commercial planting on account of the quality, and the certainty and size of its crop.—*E. L. Overholser*.

1139. CRAFTS, H. A. **Cover crops for our orchards.** Sci. Amer. 123: 567, 582-583. 1 fig. 1920.

1140. CROW, J. W. **Biennial fruitbearing in the apple.** Sci. Agric. [Canada] 1: 39-40. 1921.—Biennial bearing is not a fixed characteristic of Duchess and Wealthy varieties. Growths of spurs are classified according to length, those from 4 to 9 mm. bearing nearly all the fruit. To secure annual fruiting it is necessary to stimulate growth of the tree in the non-bearing year. Experiments at Ontario Agricultural College indicate that this is accomplished by moderate heading back of small branches in the non-bearing year, and by applying nitrate of soda in the early spring. Observations show that 75 per cent of fruit spurs on these varieties have completed their growth for the season by the time the first blossoms have well set.—*B. T. Dickson*.

1141. DANIEL, LUCIEN. **Recherches sur la greffe des Solanum.** [Investigations of the grafts of Solanum.] Compt. Rend. Acad. Sci. Paris 171: 1074-1076. 1920.—A study of grafts of potato on tomato and on mad-apple. Some of the characters of the stock, such as delay in maturing of the fruits, are imparted to the scion, thus making a situation similar to that in grafts of *Vitis vinifera* on *V. rupestris*. These new characters are transferred by asexual propagation. The tomato used as a stock is also found to affect the nature of the fruit of the mad-apple.—*C. H. Farr*.

1142. DORRIS, G. **Establishing the filbert grove.** Amer. Nut Jour. 10: 34-35. 1919.—Soil must be retentive of moisture,—river bottom soil is best. As filbert blooms and pollinates in mid-winter, location requires no consideration as to frost conditions. The Davidiana is the best pollenizer for most varieties. Each year's growth is to be cut back about 2 feet; should not head higher than 2 feet,—preferably 1 foot.—*E. L. Overholser*.

1143. ENFER, V. **Utilization des serres sans chauffage: production des légumes.** [Utilizing greenhouses without heat: growing vegetables.] Revue Hort. 92: 179-180. 1920.—The specific crops and varieties most suitable for culture in greenhouses without artificial heat, together with the directions for planting and culture of the same, are given.—*E. J. Kraus*.

1144. ESTEBAN DE FAURA, ANTONIO. **Cultivo del olivo.** [Cultivation of the olive.] El Agricultor [Santiago, Chile] 5: 123-126. 3 fig. 1920.—Reprinted from La Hacienda.—*J. A. Stevenson*.

1145. GARDNER, V. R. **Bud selection with special reference to the apple and strawberry.** Missouri Agric. Exp. Sta. Res. Bull. 39. 27 p. 1920.—See Bot. Absts. 3, Entry 1155.

1146. GAVILÁN, JUAN. **Producción y cultivo de plátanos.** [Production and cultivation of bananas.] Informacion Agric. [Madrid] 11: 1-2. 1 fig. 1921.—The banana industry of the Canary Islands is discussed.—*John A. Stevenson*.

1147. HAWKINS, LON A., AND J. R. MAGNESS. Some changes in Florida grapefruit in storage. Jour. Agric. Res. 20: 357-373. 1920 [1921].—Determinations of percentages of sugars, acids, dry matter, shrinkage of fruit, peel and the thickness of peel of grapefruit (*Citrus decumana*) when stored at 32, 36, 40, 55 \pm 5, 70, and 86° F. are reported. The fruit keeps longer at low temperatures, decay is reduced, shrinkage is less, and physiological processes are retarded. Fruit stored at 40° F. or below shows an undesirable pitting of the peel. Sunken spots appear which become 1-2 mm. in diameter and brown in color. The pit does not extend into the fruit and the flavor is unaffected. Most pitting occurred at 40° F., and none was observed at the higher temperatures. Flavor of the fruit improves in cold storage, but this improvement is more rapid at higher temperatures. The titratable acids in the fruit decrease after the fruit is removed from the tree and placed in cold storage. There is an apparent increase in sugar content in cold storage. Shrinkage is from 5 to 8 per cent in cold storage and about 23 per cent in warm ventilated storage.—D. Reddick.

1148. HOY, B. Orchard cover-crops. British Columbia Dept. Agric. Circ. New Hort. Ser. 51. 6 p., 3 fig. 1919.

1149. HOY, B. Selection of orchard sites and soils. British Columbia Dept. Agric. Circ. New Hort. Ser. 53. 7 p., 2 fig. 1919.

1150. HOY, B., AND H. H. EVANS. Pruning fruit-trees. British Columbia Dept. Agric. Circ. New Hort. Ser. 60. 20 p., 21 fig. 1920.

1151. LECOLIER, P. Un mode de greffage à préconiser; la greffe anglaise appliquée au cerisier. [A noteworthy method of grafting; the splice-graft used on the cherry tree.] Revue Hort. 92: 161-162. 1920.—The cions, of approximately the same diameter as the top of the tree to be grafted, are set in place during September, preferably the latter half of the month. After tying, a light protection of wax is advantageous. The following spring and summer the new growths may be pinched back to cause a more profuse branching of the top and the trees may be sold the autumn of the same year. The method is applicable to other stone fruits, and to apples and pears though these develop more slowly when the lateral branches are suppressed.—E. J. Kraus.

1152. LINDEN, VAN DER, J. G. HAZELOOP, EN N. VAN POETEREN. Proefneming met rook, ter bescherming van gewassen tegen nachtvorsten. [Experiments with smoke, for protection of plants against night frosts.] Mededeel. Phytopath. Dienst Wageningen 15. 22 p., pl. 1-4. 1920.—By burning fuel which develops much smoke or soot the temperature can be increased considerably over large areas. The rise of temperature is due mainly to decreased radiation from the soil on account of the cover of smoke. Direct heating of the air also takes place. Smudging of small areas from the windward side is not advisable as there is no certainty that the smoke will sufficiently cover a certain area. Peat saturated with crude naphthalene is very useful, giving much smoke and heat.—The cost per 2½ acres (1 Ha.) of raising the temperature 1°C. for 1 hour is from 40 to 50 gulden (\$16 to \$20).—The experiments were carried out in Amersfoort and Elst.—J. C. Th. Uphof.

1153. MOREL, F. Remarque sur la culture du Pêcher. [Note on peach culture.] Revue Hort. 92: 178. 1920.—Peach trees when grown against walls are generally set either on the east or south face. When it becomes necessary to replace such plantings the new trees may be set on the west or north face and the tops of the trees drawn through holes in the wall to the opposite, more desirable, exposure.—E. J. Kraus.

1154. MORRIS, O. M. Prune growing in western Washington. Washington [State] Agric. Exp. Sta. Popular Bull. 120. 21 p., fig. 1-7. 1920.—Attention is given to varieties, pruning, cultivation, and fertilizer trials. The fertilizer trials indicated that nitrogen is the element most frequently deficient in the prune orchards of Clark County. Other factors causing crop failure are unfavorable weather at blossoming time and the brown-rot.—F. D. Heald.

1155. MORRIS, ROBERT T. **Comment.** [Rev. of: KNIGHT, F. A. *Propagation of the walnut.* Trans. Hort. Soc. London 3: 133. 1918.] Amer. Nut Jour. 11: 20-21. 1919.—Critical comments on F. A. Knight's "Propagation of the walnut."—*E. L. Overholser.*

1156. MUNSON, K. W., AND E. W. WHITE. **Loganberry culture.** British Columbia Dept. Agric. Circ. New Hort. Ser. 54. 23 p., 10 fig. 1920.

1157. MUNSON, K. W., AND E. W. WHITE. **Raspberry culture.** British Columbia Dept. Agric. Circ. New Hort. Ser. 55. 15 p., 7 fig. 1920.

1158. NANOT, JULES. **Reconstitution des plantations fruitières dans les régions libérées et évaluation des dommages causées aux arbres.** [Restoration of orchards in the liberated regions with an estimate of the damage done to the trees.] 84 p., 50 fig. Miason: Paris, 1920.

1159. ORB, G. **The story of the prune.** Sci. Amer. 124: 52. 3 fig. 1921.

1160. PRAY, LUIS. **Plantemos frutillares industriales.** [Commercial strawberry plantings.] El Agricultor [Santiago, Chile] 5: 5-7. 2 fig. 1920.

1161. PRAYAG, S. H. **The influence of stock and scion and their relation to one another.** Agric. Jour. India 15: 533-542. 3 fig. 1920.—Some stocks have a distinct preference for particular scions while others do not. The stock plays an important part in influencing the habit of growth and hardness of the scion. The formation, at the point of union, of big knotty excrescences in plants whose rate of growth is not similar, considerably checks growth. Grafted plants composed of parts having different periods of rest fail to grow into big plants. The scion has a preponderating influence in determining the character of the fruit produced by it. The position of the mature scion at the end of a branch in a large tree influences the flowering. It is undesirable to insert scions of more than one variety on the branches of a single stock. Grafting between different genera, though succeeding in some cases, has not been found successful in the mango.—*J. J. Skinner.*

1162. RINGELMANN, M. **Chauffage des serres au bois.** [Heating greenhouses with wood.] Revue Hort. 92: 180-181. Fig. 62-63. 1920.—A method is detailed of making and fitting special grates for the burning of wood in furnaces intended for the use of coal.—*E. J. Kraus.*

1163. RIVIÈRE, GUSTAVE, ET GABRIEL BAILHACHE. **Observations sur la composition de l'atmosphère d'un fruitier dans lequel on conserve des pommes de Caville Blanc.** [Observations on the composition of the atmosphere of a fruit store where apples are kept.] Jour. Soc. Nation. Hort. France 21: 151-153, 202-204, 234-235. 1920.—The writers state that after apples are mature, during the period they are kept in the fruit store or storage room, they lose their green color, and, due to chemical reactions in the apple itself, they give off CO₂ and take in oxygen whether they be in the light or in partial or total darkness. Due to this giving off of CO₂ the atmosphere in the fruit store becomes considerably modified and it is the belief of the writers that this must have some effect on the fruit itself. Analyses were made of the air of a fruit storage room and it was found to contain a large amount of CO₂. The writers conclude that CO₂ must be an important factor in the keeping of fruits, since in experiments with pears, covering several years small quantities of CO₂ retarded maturity and arrested it completely when in excess. Results are given of temperature and humidity studies in a fruit storage room. When the temperature was the highest, 10°C., the humidity was also the highest, 94 per cent of saturation. At the lowest temperature, 2°C., the humidity was 88. It is stated that this high humidity probably accounts for apples keeping for a long time with only a slight withering or wrinkling of the skin. The writers conclude that the temperature ought to be maintained between 2 and 4°C., and add that this can be accomplished only under refrigeration.—*H. C. Thompson.*

1164. ROBERTSON, W. H. **Currant and gooseberry culture.** British Columbia Dept. Agric. Circ. New Hort. Ser. 61. 8 p. 1921.

1165. SHRIVASTAVA, K. P. A preliminary note on the improvement of oranges. *Agric. Jour. India* 15: 508-515. 6 fig. 1920.—A general discussion is given of pruning, irrigation, and manuring. Experiments are being made with organic manures and mineral fertilizers. There is a distinct improvement in the vegetation, growth, and fruiting of the trees resulting from the use of nitrogenous manures. Mohwa (*Bassia latifolia*) refuse is producing best results, followed by castor cake, cattle dung, and calcium nitrate. The mineral fertilizers have as yet produced no noticeable effect.—J. J. Skinner.

1166. SIEBERT, A. Kriegswirtschaftliche Betätigung des Palmengartens. [Cooperation of the Palm Garden in war activities.] *Ber. Senckenberg. Naturf. Ges. Frankfurt a. M.* 49: 83-84. 1919.—The activities of the Palm Garden at Frankfurt in helping to increase the production of vegetable foods in Germany are here reported. The propagation of potatoes by means of cutting is described, and the cultivation of certain vegetables which had previously been imported has proved practicable.—A. W. Evans.

1167. SKERRETT, R. G. California's citrus fruit industry. *Sci. Amer. Monthly* 2: 212-216. 11 fig. 1920.

1168. WEST, FRANK L., AND N. E. EDLEFSEN. Freezing of fruit buds. *Jour. Agric. Res.* 20: 655-662. Pl. 75. 1921.—Thermometers were hung in tree tops and temperature records kept for all spring nights with freezing temperatures. Flowers were also frozen in chambers and records kept. Tables are given showing the percentage of blossoms of different ages killed by different temperatures.—W. H. Chandler.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1169. ANONYMOUS. A new Polygonum. *Florists' Exchange* 50: 1017. 1920.—*P. campanulatum* attracted much attention and received an award of merit when recently shown in London. It is a plant of bushy growth, 2½ ft. high, with distinctly bell-like flowers, and colored much like *Kalmia latifolia*. It is probably a plant of great promise, a possible acquisition for pot work.—L. A. Minns.

1170. ANONYMOUS. Eupatoriums as a florists' flower. *Florists' Exchange* 50: 873. 1920.—Note is made of the use of a *Eupatorium* in one of the florists' stores of Boston. The writer then lists useful Eupatoriums for garden and greenhouse, some of which are little known and seldom seen. The list includes, of hardy herbaceous kinds, *E. perfoliatum*, *E. agertoides*, and *E. Fraseri*, all white, and *E. coelestinum*, one of the best blue perennials; while for growing under glass there are *E. Purpusi*, sweetscented, pink, and *E. conspicuum*, shrub-like, a good winter bloomer and summer bedder.—L. A. Minns.

1171. ANONYMOUS. New plants. *Florists' Exchange* 50: 863. 1920.—Attention is called to new plants recently exhibited in London, among which were several named varieties of hardy asters; *Helianthus*, "Monarch," of the *rigidus* section, having 3 or 4 rows of ray florets and described as magnificent; and a new Dahlia, "Ada Finch," described as clematis-flowered in form.—L. A. Minns.

1172. BAUER, G. Le *Leontopodium alpinum* Cass; culture sur rocailles. [The culture of *Leontopodium alpinum* Cass., in rockeries.] *Revue Hort.* 92: 165-166. Fig. 58-59. 1920.

1173. BELLAIR, G.-A. ET P. Parcs et jardins. [Parks and gardens.] 382 p., 226 fig. J.-B. Baillière et Fils: Paris, 1919.

1174. BOYNTON, KENNETH R. *Eupatorium coelestinum*. *Addisonia* 4: 39-40. Pl. 140 (colored). 1919.—*Eupatorium coelestinum* L. is illustrated and redescribed. The species is a native of eastern U. S. A. and Cuba.—T. J. Fitzpatrick.

1175. BOYNTON, KENNETH R. *Sedum spectabile*. Addisonia 4: 3. Pl. 122 (colored). 1919.—This showy *Sedum*, first characterized by Boreau in 1866, although propagated by horticulturists since about 1860, is described. The presumed nativity is Japan.—T. J. Fitzpatrick.

1176. BROWN, W. ROBERTSON. The frash (*Tamarix articulata*). Agric. Jour. India 14: 758-761. Pl. 2. 1919.—The article discusses the use of the "Frash" as a windbreak, or as a hedge for dividing estates, etc. The tree is well depicted in the illustrations.—J. J. Skinner.

1177. KÖCK, G. Vergleichende Bodentemperaturmessungen. [Comparative soil-temperature measurements.] Zeitschr. Landw. Versuchsw. Deutschösterreich 23: 69-87. 1920.—Comparative soil temperatures were taken at a depth of 30 cm. near the north, south, east, and west walls of a trellis garden. The walls were 2 meters high and peach trees had been trained against them. Temperatures were taken each day at 7 a.m., 12 m. and 6 p.m. for 1 year. Average daily and monthly temperatures, maxima, minima, etc., are given. Air temperatures were also taken for comparison. Taking the whole year into consideration the warmest situation for trellis-plants would be the south side of the wall, the east, north, and west sides following in the order named. From a temperature standpoint, the north and west situations are closely related as also are the east and south situations. Especially in December, January, and February does the north side surpass the south and east sides in temperature, and it is also considerably higher than the west side. In the other months, the west side is somewhat higher in temperature than the north side and the south and east sides surpass both.—John W. Roberts.

1178. MACKENZIE, KENNETH K. *Eupatorium maculatum* L. Addisonia 4: 23-24. Pl. 132 (colored). 1919.—The author gives a description, with notes, of this the most conspicuous of the joe-pye weeds, a native of northeastern North America.—T. J. Fitzpatrick.

1179. NASH, GEORGE V. *Celastrus articulatus* Thunb. Addisonia 4: 9-10. Pl. 125 (colored). 1919.—A hardy, shrubby bittersweet, native of China and Japan, frequently cultivated, rather closely related to *Celastrus scandens* of the United States.—T. J. Fitzpatrick.

1180. NASH, GEORGE V. *Crataegus macrosperma*. Addisonia 4: 35. Pl. 138 (colored). 1919.—A variable species, ranging throughout northeastern United States and Nova Scotia.—T. J. Fitzpatrick.

1181. NASH, GEORGE V. *Crataegus succulenta*. Addisonia 4: 5-6. Pl. 123 (colored). 1919.—A species of the *macracanthae* group, native of Nova Scotia and northeastern United States, possessing economic possibilities.—T. J. Fitzpatrick.

1182. NASH, GEORGE V. *Forsythia Fortunei*. Addisonia 4: 17-18. Pl. 129 (colored). 1919.—An early blooming shrub of the olive family, a native of China, frequent in cultivation.—T. J. Fitzpatrick.

1183. NASH, GEORGE V. *Malus Halliana*. Addisonia 4: 27. Pl. 134 (colored). 1919.—A decorative shrub, native of western China, introduced into the United States in about 1863, by Dr. G. R. Hall.—T. J. Fitzpatrick.

1184. NASH, GEORGE V. *Oxydendrum arboreum*. Addisonia 4: 37-38. Pl. 139 (colored). 1919.—A species of the monotypic genus, native of southeastern United States, introduced into England and elsewhere.—T. J. Fitzpatrick.

1185. PARTINGTON, J. B. Rose culture. British Columbia Dept. Agric. Circ. New Hort. Ser. 59. 5 p., 2 fig. 1920.

1186. PENNELL, FRANCIS W. *Penstemon calycosus*. Addisonia 4: 31-32. Pl. 136 (colored). 1919.—A showy species, growing on shaded calcareous soil, native of the south-eastern Mississippi Valley.—*T. J. Fitzpatrick*.

1187. PENNELL, FRANCIS W. *Pentstemon digitalis*. Addisonia 4: 19-20. Pl. 130 (colored). 1919.—A lengthy description of the species is given, with comments on the genus. The species is a native of southwestern Mississippi Valley, introduced eastward.—*T. J. Fitzpatrick*.

1188. PROSCHOWSKY, A. R. *Albizia lophanta* Benth., var. *speciosa*. Revue Hort. 92: 174-175. 1920.—A beautiful tree of rapid growth, readily propagated from seed and well adapted to dry situations, this plant should be grown abundantly as a decorative perennial in the milder climates and as an annual in the more northern locations.—*E. J. Kraus*.

1189. ROLET, A. Le froid artificiel régulateur des marchés dans le commerce des fleurs coupées. [Refrigeration a regulator of the cut flower trade.] Revue Hort. 92: 175-176. 1920.—An argument for the installation of refrigeration plants as community enterprises at the points of origin of the crops or at the market centers.—*E. J. Kraus*.

1190. SMALL, JOHN K. *Chamaecrista Deeringiana*. Addisonia 4: 1-2. Pl. 121 (colored). 1919.—A full description is given of this perennial species, a native of southern Florida, with notes on the related species *C. brachiata*. *C. Deeringiana* is readily distinguishable by its stout, elongated, horizontal rootstock which is stated to be quite an exception in this genus.—*T. J. Fitzpatrick*.

1191. SMALL, JOHN K. *Heliotropium Leavenworthii* Torr. Addisonia 4: 29-30. Pl. 135 (colored). 1919.—A lengthy description with comment is included of this species, which occurs on the edges of the Everglades and in the adjacent pinelands of southern Florida.—*T. J. Fitzpatrick*.

1192. SMALL, JOHN K. *Heliotropium polyphyllum* Lehm. Addisonia 4: 25-26. Pl. 133 (colored). 1919.—A full description with comments is given. The species is a native of southern Florida and tropical America.—*T. J. Fitzpatrick*.

1193. SMALL, JOHN K. *Ipomoea tenuissima*. Addisonia 4: 15-16. Pl. 128 (colored). 1919.—A full description is given of this pink morning-glory, a native of the pine woods of southern Florida, Cuba, and Hispaniola.—*T. J. Fitzpatrick*.

1194. SMALL, JOHN K. *Limodorum Simpsonii*. Addisonia 4: 7-8. Pl. 124 (colored). 1919.—A full description is given of this terrestrial orchid, a native of the Everglades of Florida, found also in the Bahamas and Cuba.—*T. J. Fitzpatrick*.

1195. SMALL, JOHN K. *Mentzelia floridana*. Addisonia 4: 13-14. Pl. 127 (colored). 1919.—A species of the Loasa family, found about hammocks in Florida and the Bahamas.—*T. J. Fitzpatrick*.

1196. SMALL, JOHN K. *Okenia hypogaea*. Addisonia 4: 11-12. Pl. 126 (colored). 1919.—A species of the four-o'clock family, originally collected on sand hills near Vera Cruz, Mexico, since found in southern Florida. This species is the type of the genus.—*T. J. Fitzpatrick*.

1197. SMALL, JOHN K. *Rhabbadenia corallicola*. Addisonia 4: 33-34. Pl. 137 (colored). 1919.—An erect or diffuse shrub of the family Apocynaceae, native of southern Florida, occurring in the pinelands, and blooming throughout the year. A full description is given with notes and comment.—*T. J. Fitzpatrick*.

1198. TURBAT, E. Deux belles roses. [Two good roses.] *Revue Hort.* 92: 178. 1 pl (colored). 1920.—The variety Willowmere (Pernet-Ducher 1913) is the result of a cross between an unnamed variety and Lyon Rose, which latter it much resembles but is an improvement in being more hardy and floriferous; Arthur R. Goodwin (Pernet-Ducher 1909) is the offspring of a seedling crossed with Soleil d'Or, reddish orange copper in color and vigorous. Both are suited for breeding or for use as cut-flowers.—*E. J. Kraus.*

1199. VACHEROT, M. Les Oeillettes a grandes fleurs. [Large flowered carnations.] *Revue Hort.* 92: 176-177. Fig. 60-61. 1920.—Notes relative to recent improvement in the quality of carnations, particularly of the American type, together with brief cultural directions.—*E. J. Kraus.*

HORTICULTURE PRODUCTS

1200. ANONYMOUS. [Rev. of: KNAPP, A. W. Cocoa and chocolate: their history from plantation to consumer. xii + 210 p., illus. Chapman & Hall: London, 1920.] *Sci. Prog.* [London] 15: 320-321. 1920.

1201. ANONYMOUS. The palm sugar industry in Bengal. *Louisiana Planter and Sugar Manufacturer* 65: 3-4. 1920.—The palm sugar industry is very old but is declining at present. The Phoenix and Borassus palms are the ones chiefly used. Bengal produced 10,000 tons of palm sugar in 1913-14.—*C. W. Edgerton.*

1202. BURNS, W. The drying of bananas. *Agric. Jour. India* 15: 166-173. 1920.—The investigation shows that sun heat is sufficient for the drying of bananas and that all varieties can be successfully dried. For a good color a card board screen should be used during the last few days of drying. The product should be stored in air tight tins. The apparatus used is a simple lattice tray which can be closed with covers. Fully ripe fruit free from skin should be used.—*J. J. Skinner.*

1203. PARIS, G. L'industria delle ciliege bianche. [White cherry industry.] *Staz. Sperim. Agrarie Ital.* 53: 187-227. 1920.—This is a study of the commercial phases of the industry and of the scientific principles underlying it.—*A. Bonazzi.*

1204. PATWARDHAM, V. G. Gur-making from the juice of the date-palm (*Phoenix sylvestris*) in the Thama District of the Bombay Presidency. *Agric. Jour. India* 15: 525-532. 1920.—Experiments were made to determine the best juice suitable for gur making and to get gur of solid crystalline consistency. Juice treated with formalin gave solid gur of good grain; chloroform likewise gave solid gur, but with no grain. Juice treated with acetic acid produced gur which was soft and sticky, of good light color, but not of good taste. Tartaric acid added to juice gave a solid crystalline gur, with no change in color. The data are presented in tabular form, showing the effect of different processes and varying amounts of acid on the qualities of gur.—*J. J. Skinner.*

1205. PRAY, LUIS. Practicas generales sobre la elaboracion de los vinos. [Practical methods of making wines.] *El Agricultor* [Santiago, Chile] 5: 53-57. 1920.—Discusses collecting, milling, sulphitation, fermentation, and other steps in the process of making wine.—*John A. Stevenson.*

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 779, 788, 943, 1013, 1019, 1021, 1041, 1044, 1085, 1342, 1367, 1374, 1429, 1494)

1206. BELYEA, H. C. Ray tracheid structure in second growth *Sequoia Washingtoniana*. Bot. Gaz. 68: 467-476. 5 fig. 1919.—Second growth trunks of *Sequoia washingtoniana* are wanting in true ray tracheids; instead, vertical wood tracheids bend at the ray, and are contiguous thereto for some little distance. Communicating pits develop in these contiguous walls of rays and tracheids. These modified vertical tracheids are believed to function as ray tracheids.—H. C. Cowles.

1207. BOUYGUES, H. Le meristeme terminal de la tige et sa division en regions. [The terminal meristem of the stem and its division into zones.] Compt. Rend. Acad. Sci. Paris 171: 926-927. 1920.—Two regions of the meristem, a prevascular and a cortical zone, are distinguished.—C. H. Farr.

1208. BUGNON, P. Sur l'emploi d'encre commerciale en histologie végétale. [On the use of commercial inks in vegetable histology.] Compt. Rend. Acad. Sci. Paris 169: 1051-1054. 1919.—Commercial inks having a base of tannin and iron sulphate have been successfully employed in the staining of pectin-cellulose membranes, giving a blue which is adapted to the use of a counter stain of red, brown, or green. Inks having log-wood (haematoxylin) as a base have also been shown to be satisfactory for certain purposes. Formulas for the preparation of ink stains with various other stains are given.—V. H. Young.

1209. DETJEN, L. R. Peloria in *Viola primulaefolia* Linn. Torreyia 20: 107-116. Fig. 1-11. 1920.—Peloria in European species of *Viola* (*V. odorata* and *V. hirta*) has been known since 1775. Two forms are recognized, the incomplete and the complete. A plant of *V. primulaefolia* was discovered at West Raleigh, North Carolina, producing flowers not only with all the various forms of peloria, but with a general reduction and tendency toward numerical uniformity in all the floral whorls. In this plant the flower was not only perfectly regular but all the parts were in fours. Other plants collected at the same station possessed from 1 to 4 saccate petals, and showed variations in the number and character of parts in each floral whorl. Plants grown from seed of these peloric plants produce peloric flowers, which remain uniform under great differences of environment, and such plants apparently breed true to type both vegetatively and sexually.—J. C. Nelson.

1210. GATIN, V. C. Recherches anatomiques sur le pedoncule et la fleur des Liliacées. [An anatomical study of the peduncle and flower of the Liliaceae.] Rev. Gén. Bot. 32: 460-528. Fig. 32-55. 1920.—A continuation of the anatomical study previously reported. In this number the 10th tribe of the Lilioideae is covered, together with the tribes of the sub-family Asphodeloideae and 5 tribes of the sub-family Asparagoideae.—J. C. Gilman.

1211. LAND, W. J. G. Botany of the living plant. [Rev. of: BOWER, F. O. Botany of the living plant. x + 580 p., 447 fig. Macmillan: London, 1919 (see Bot. Absts. 4, Entries 526, 1394; 7, Entry 1608).] Bot. Gaz. 68: 478-479. 1919.—The book is highly praised for its embodiment of long years of first-hand contact with material and of long teaching experience. The gymnosperms are felt to be inadequately treated, and minor criticisms are noted in the treatment of the liverworts.—H. C. Cowles.

1212. SCHAFFNER, JOHN H. A remarkable bud sport of *Pandanus* [utilis]. Jour. Heredity 10: 376-378. Fig. 14. 1919.—The bud sport (mutation) shows a two-ranked arrangement of the leaves without spiral twist as opposed to the normal three-ranked arrangement with spiral twist. A progressive phyletic arrangement is suggested for the related genera *Pandanus*, *Sparganium*, and *Typha*.—J. R. Schramm.

1213. SCHERTZ, F. M. Early development of floral organs and embryonic structures of *Scrophularia marylandica*. Bot. Gaz. 68: 441-450. 3 pl. 1919.—The order of development of floral parts is calyx, stamens, corolla, pistil, the stamens and corolla arising from a common outgrowth. The megaspore archesporium consists of 1 hypodermal cell, functioning as a megaspore mother cell, which gives rise to an axial row of 4 potential megaspores. The embryo sac comes from the chalazal one, the others degenerating. The mature sac has 1 egg, 2 large synergids, an endosperm nucleus, and 3 antipodal nuclei which soon degenerate. A secondary endosperm nucleus was observed, also the fusion of polar nuclei. The 1st division of the fertilized egg is transverse, and is followed by a longitudinal division of the chalazal nucleus. The nucellus consists of a single cell layer around the megaspore. A 1-celled tapetal layer develops around the sac, forming as the megaspore mother cell divides. Two prominent haustoria form at the chalazal end of the sac, and 4 weaker ones at the micropylar end. There is a single thick integument. Before the egg divides, endosperm cells form, separating the egg from the micropylar end. There is a short suspensor, which disappears at embryo maturity. In the seed the embryo is surrounded by thick endosperm cells gorged with food.—F. M. Schertz.

1214. SCHÜEPP, OTTO. Beiträge zur Entwicklungsgeschichte der Stockausschläge. [Concerning the developmental history of stem shoots.] Vierteljahrsschr. Naturforsch. Ges. Zurich 63: 106-115. 1918.—The vegetative point of a lateral shoot arises as a small meristem-complex and begins developing leaves long before it has attained the size and structure of the mother vegetative point.—John H. Schaffner.

1215. SCHÜEPP, OTTO. Zur Entwicklungsgeschichte des Blattes von *Acer pseudoplatanus* L. [Developmental history of the leaf of *Acer pseudoplatanus* L.] Vierteljahrsschr. Naturforsch. Ges. Zurich 63: 99-105. 1918.—An outline of the origin of the various leaf tissues from the meristem.—John H. Schaffner.

1216. SOUÈGES, RENÉ. Embryogenie des Urticacées. Développement de l'embryon chez *Urtica pilulifera* L. [The embryology of the Urticaceae. The development of the embryo of *Urtica pilulifera*.] Compt. Rend. Acad. Sci. Paris 171: 1009-1011. 1920.—A scheme is presented for tabulating the development of the embryo of angiosperms, showing the parts from which each portion of the embryo is derived and the separation of the various primordia in the successive divisions. The development of the embryo of *Urtica* is found to follow in general that of *Senecio vulgaris*.—C. H. Farr.

1217. THODAY, M. G. Anatomy of the ovule and seed of *Gnetum gnemon* with notes on *Gnetum funiculare*. Ann. Botany 35: 37-54. Pl. 1, fig. 1-5. 1921.—The changes which take place in the envelopes of the ovule of *G. gnemon* during development are described. The micropylar tube which is a continuation of the innermost of the 3 envelopes becomes closed. A flange-like outgrowth of this tube becomes fused at the top with the outermost envelope and at the bottom projects over the middle envelope. The growth of the outer covering carries the closed micropylar tube upwards causing its apical region to break away from the base. This upper region thus forms a sort of stopper which is carried still further upwards. The basal part then projects as a sort of beak through the opening at the top of the middle covering. The conditions here described are compared with those in Bennettitales.—W. P. Thompson.

1218. THOMPSON, W. P. Companion cells in bast of *Gnetum* and angiosperms. Bot. Gaz. 68: 451-459. 7 fig. 1919.—*Gnetum* has companion cells resembling those of angiosperms in size, structure, and location, but not in development; in *Gnetum* sieve tubes and companion cells are produced from different rows of cambial cells, instead of from 2 successive cells in a single row. This is thought to indicate parallel evolution rather than genetic relationship.—H. C. Cowles.

1219. WILLIAMSON, H. S. A new method of preparing sections of hard vegetable structures. Ann. Botany 35: 139. 1921.—Hard materials to be sectioned are transferred from water to

pure acetone and then to a 12 per cent solution of cellulose acetate in acetone. By this method they are not only imbedded but also softened. Woods such as oak or beech are sufficiently softened for sectioning after 6 days in the solution.—*W. P. Thompson.*

1220. WISSELINGH, C. VAN. *Bijdragen tot de Kennis van de Zaadhuid. Achtste bijdrage: Over de Zaadhuid bij de orde der Centrospermae.* [Contribution to a knowledge of the seed-coat. Eighth contribution: The seed-coat of the Centrospermae.] *Pharm. Weekbl.* 57: 1193-1211. *Pl. 1, fig. 10.* 1920.—In the campylotropic ovule of the Centrospermae 3 cuticles can be distinguished, 1 on the epidermis, 1 between the 2 integuments, and 1 between the innermost integument and the nucellus. During the development of the ovule into the seed in some cases (Caryophyllaceae) the cuticle on the epidermis disappears; in other cases (*Beta vulgaris*, *Amaranthus caudatus*, *Portulaca grandiflora*) the cuticle between the 2 integuments is lost, either partly or altogether. The cuticle between the seed-coat and the nucellus remains and becomes rather thick. In the chalaza a cork-tissue is developed, which borders the thick cuticle between the seed-coat and the nucellus but which differs from other chalaza cork tissues in that the cork-cells are thickened at the corners (*Beta vulgaris*) or in that the cell-walls are covered with a cutin-like substance.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See also in this issue Entries 932, 933, 1291, 1360)

1221. BRISTOL, B. MURIEL. On a Malay form of *Chlorococcum humicola* (Näg.), Rabenh. *Jour. Linn. Soc. Bot. London* 44: 473-482. *Pl. 17-18.* 1920.—The author describes an alga obtained by culture from a sample of soil from Kuala Lumpur that had been dry for two years. Reproduction by zoospores, which may also act as gametes, was observed. Aplanospores are formed which germinate and produce a palmella-stage, and these cells produce the usual vegetative cells directly, or indirectly by means of zoospores. In dried soil samples *Chlorococcum* has been known to retain its vitality more than 70 years.—*E. N. Transeau.*

1222. BRISTOL, B. MURIEL. A review of the genus *Chlorochytrium*, Cohn. *Jour. Linn. Soc. Bot. London* 45: 1-28. *Pl. 1-3, fig. 1.* 1920.—In continuation of the work of G. S. WEST in submerging 6 genera into the genus *Chlorochytrium*, this paper contains a critical discussion of the present limits of the genus and the criteria that may be used to define species. As a result of further study of the morphology of these forms, 10 well-defined and 3 doubtful forms are included in the genus. The recognized species are: *Chlorochytrium Lemnae* Cohn; *C. bienne* (Klebs) G. S. West; *C. paradoxum* (Klebs) G. S. West; *C. Facciolaiae* (Borzi) Bristol, and var. *minor* (Borzi) Bristol; *C. grande* Bristol; *C. Limnanthemum* (D.D. Cunningham.) G. S. West; *C. inclusum* Kjellman, and var. *dermatocolax* (Reinke) Bristol; *C. Sarcophyci* (Whitting) G. S. West; *C. Cohnii* E. P. Wright, and var. *Porphyrae* (Gardner) Bristol; and *C. Moorei* Gardner. The doubtful forms are *C. laetum* Schroeter, *C. viride* Schroeter, and *C. rubrum* (Schroeter) Freeman.—*E. N. Transeau.*

1223. BRITTON, NATHANIEL LORD, AND CHARLES FREDERICK MILLSPAUGH. *The Bahama Flora.* *Roy. 8vo., viii + 695 p.* Published by the authors: New York, June 26, 1920.—See Bot. Absts. 7, Entry 1429.

1224. CONRAD, W. Contributions a l'etude des Chrysomonadines. [Contributions to the study of the Chrysomonads.] *Bull. Acad. Roy. Belgique, Cl. Sci.* 1920 ⁴⁻⁵: 167-189. *11 fig.* 1920.—The author takes up first *Synura Uvella* Ehr., and brings together his own observations and those of others on the cell, its division, and the formation of colonies. *Thallochrysis Pascheri* is described as a new genus and species, the type of a new family, the *Thallochrysidaceae*. The taxonomic characters of *Chrysapsis sphagnum* n. sp. and other indigenous species of *Chrysapsis* are given.—*Henri Micheels.*

1225. COSTANTIN, J. Travaux recents sur les Thallophytes. [Recent work on the Thallophytes.] Ann. Sci. Nat. Bot. X, 1: xxx-xxxvi. 1919.—The author calls attention to studies on Laminarias, mentioning especially C. SAUVAGEAU's contributions to knowledge of their life cycle. Reproductive bodies borne along median line of blades are asexual (zoospores) and are said to give rise on germination to minute filamentous sexual thalli which are dioecious. In *Sacchorhiza* the female thallus is obliterated and the egg is the protoplasm of the zoospore made ready for fertilization. Actual observation of fusion of gametes is not reported. Sauvageau's cultural methods are briefly described. Economic possibilities of marine agriculture are dwelt upon.—James P. Kelly.

1226. FISCHER, L. Tabellen zur Bestimmung einer Auswahl von Thallophyten und Bryophyten. [Keys for the determination of a selected group of thallophytes and bryophytes.] 60 p. Bern, 1918.

1227. FORTI, ACHILLE. Elenco preliminare della flora pelagica del seno di Quarto dei Mille presso Genova. [Preliminary catalogue of the palagic flora of the Quarto dei Mille Bay, near Genoa.] La Nuova Notarisia 31: 65-72. 1920.—The paper consists of a list of 235 species of pelagic organisms, representing the groups Cystoflagellata (1), Dinoflagellata (Peridinales) (123), Acontae (Bacillariales) (101), Silicoflagellata (3), Coccosphaerales (1), and Chlorophyceae (6).—Marshall A. Howe.

1228. FRITSCH, F. E., AND E. STEVENS. Contributions to our knowledge of the freshwater algae of Africa: 3. Freshwater algae (exclusive of diatoms) mainly from the Transkei Territories, Cape Colony. Trans. Roy. Soc. South Africa 9: 1-72. Fig. 1-29. 1921.—An annotated list of algae collected in South Africa enumerating 146 species belonging to 63 genera, including Isokontae, Heterokontae, Cyanophyceae, Florideae, and Flagellata. Six new species, a new subspecies, and 13 new varieties are described. The new species are *Enteromorpha basiramosa*, *Closterium pegleri*, *C. pseudolibellula*, *Euastrum submontanum*, *E. simpliciforme*, and *Spirogyra subreticulata*.—E. N. Transeau.

1229. GARD, MEDERIC. Biologie d'une nouvelle espece d'Euglene (*Euglena limosa* nov. spec.). [Biology of a new species of *Euglena* (*Euglena limosa* nov. spec.).] Compt. Rend. Acad. Sci. Paris 169: 1423-1425. 1919.—A brief description of the morphological characteristics and behavior of a new species of *Euglena*, *E. limosa*, and a discussion of the work of ROSE BRACHER [Ann. Bot. 33: 93-108. 1919] on *Euglena deses*, Ehrenberg.—V. H. Young

1230. GHOSE, S. L. *Campylonema lahorensis*, a new member of Scytonemaceae. New Phytol. 19: 35-39. Fig. 1-6. 1920.—A blue-green alga from Lahore, formerly referred by the author to *Tolypothrix arenophila* W. and G. S. West, is here shown to be distinct and is described under the name given.—I. F. Lewis.

1231. GHOSE, S. L. The Myxophyceae of Lahore. Jour. Indian Bot. 1: 8-13. 1919.—An annotated list of blue-green algae of Lahore, India.—E. N. Transeau.

1232. GROVE, W. B., B. MURIEL BRISTOL, AND NELLIE CARTER. The flagellates and algae of the district around Birmingham. Jour. Botany 58: Suppl. 3. 1-55. 1920.—The extensive list making up the bulk of this paper was compiled almost exclusively from records made by the late G. S. WEST during the last 13 years of his life. The summary of species listed is as follows: Flagellates, 33; Myxophyceae, 83; Peridineae, 6; Bacillariae, 155; Chlorophyceae, 444; and Rhodophyceae, 6. A bibliography is appended.—K. M. Wiegand.

1233. HODGETTS, WILLIAM J. A new species of *Spirogyra*. Ann. Botany 34: 519-524. Pl. 22, 5 fig. 1920.—A description of *Spirogyra colligata* is presented. The species is remarkable in presenting a new form of cross walls between adjacent cells in the filaments. The cross walls are plane but possess an extra layer which recalls the so-called H-shaped pieces in the walls of *Microspora*. Conjugation may take place through the end walls as well as by the usual methods known for other species of the genus.—E. N. Transeau.

1234. HOWE, MARSHALL A. *Algae*, in Britton's "Flora of Bermuda," p. 489-540. 1918.—See Bot. Absts. 8, Entry 687.

1235. HOYT, W. D. *Marine algae of Beaufort, N. C., and adjacent regions*. Bull. U. S. Bur. Fisheries 36: 367-556. Pl. 84-119, 47 fig. 1920.—Following a general account of the region, the local distribution, the ecological factors, the seasonal distribution, and methods of collecting and preserving algae are discussed. Most of the bulletin is given over to a systematic account of the 133 species and varieties found. Of these, 10 are Myxophyceae, 25 Chlorophyceae, 27 Phaeophyceae, and 71 Rhodophyceae. Descriptions, critical notes, and keys are given for all the species included. The plates are largely photographs. New species described are *Nitophyllum medium* and *Streblonema invisibile*.—E. N. Transeau.

1236. LEMOINE, MME. PAUL [LEMOINE, MARIE]. *Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907-1909. VII. Les Melobesiées*. [Botanical results of the Swedish expedition to Patagonia and Tierra del Fuego 1907-1909. VII. The Melobesiaceae.] K. Svenska Vetenskapsakad. Handl. 61⁴: 1-17. Pl. 1. 1920.—The author discusses and describes specimens collected by Dr. CARL SKOTTSBERG. Five species are attributed to the island of Chiloe, 1 to the island of Huafu, 2 to Juan Fernandez, 6 to Tierra del Fuego, 1 to the island of Atalaya, and 6 to the Falkland Islands. Six species, *Lithothamnium paucisporum*, *L. Caroli*, *L. (?) Skottsbergii*, *Lithophyllum (?) almanense*, *L. fernandezianum*, and *L. atalayense*, are described as new.—Marshall A. Howe.

1237. LEWIS, IVEY F., AND CONWAY ZIRKLE. *Cytology and systematic position of Porphyridium cruentum Naegeli*. Amer. Jour. Bot. 7: 333-340. 2 pl. 1920.—The authors give an account of the somewhat tangled taxonomic history of this species, and discuss briefly the conflicting descriptions of it which have been presented by various writers. From the results of their own observations, the authors suggest that previous workers may have studied different growth states of the same species rather than different species. The cells are surrounded by jelly and are usually borne on gelatinous stalks. The chromatophore is star-shaped in resting cells, amoeboid in growing ones. The pyrenoid is distinct, easily stainable and centrally located, and is generally spheroidal. In the resting stage there is a single eccentric globule of chromatin homologous to a nucleus or nucleolus. Nuclear division is crudely mitotic. The authors suggest that for the present *Porphyridium* should be kept in the Bangiaceae.—E. W. Sinnott.

1238. LINDEMANN, E. *Untersuchungen über Süßwasserperidineen und ihre Variationsformen II*. [Investigations of fresh-water Peridineae and their variations.] Arch. Naturgesch. Abt. A 84: 121-194. Fig. 1-200. 1918 [1920].—A continuation of work reported under the same title (Arch. Protistenk. 39: 209-262. Pl. 17, fig. 1-144. 1919). The author discusses the grouping of the Peridineae and describes his method of distinguishing and designating forms, subvarieties, subspecies, and varieties. Descriptions are given of 17 forms, 3 subvarieties, 31 varieties, and 14 species. He also discusses the distribution of members of the group with reference to season and composition of the water, and their association with other plankton constituents. Additional notes are given of stations for 27 species, 3 varieties, and 3 forms.—C. E. Allen.

1239. LUCAS, A. H. S. *Algae of Commonwealth Bay*. Australasian Antarctic Expedition, 1911-14, Sci. Rept. Ser. C. 7²: 18 p., 9 pl. 1919.—An account of the algae of the antarctic region with description of two new species: *Chaetomorpha Mawsoni* and *Iridaea Mawsoni*. Victoria Land and Commonwealth Bay are each credited with 14 species of which 8 are common.—E. N. Transeau.

1240. LYLE, LILIAN. *The marine algae of Guernsey*. Jour. Botany 58: Suppl. 2. 1-53. 1920.—The present list and notes, both ecological and taxonomic, were based on collections and field studies made in 1911, 1912, and 1914. In all, 250 species and 78 varieties and forms are listed from the island. *Chantransia Lorrain-Smithiae* Lyle and *Gelidium latifolium* Born.

var. *Hystrix*, forma *condensata* Holmes are described as new. Descriptions of some less well known species are given. In the section on ecology the author discusses the algal ecology of Guernsey under 7 headings: (1) Physical position of the island; (2) tides; (3) currents; (4) nature of the substratum; (5) configuration of the coast; (6) salinity; and (7) temperature. Three main regions are recognized: Upper littoral, middle littoral and sub-littoral. These are subdivided into zones to the extent of 15 in all. The zones are mostly named from their most characteristic plant. A comparison of the Guernsey algal flora with that of the neighboring coast is made. An account of the uses made of algae concludes the paper.—K. M. Wiegand.

1241. MARKLE, M. S. Some abnormalities in plant structure. Proc. Indiana Acad. Sci. 1918: 117-124. Fig. 1-9. 1920.—See Bot. Absts. 7, Entry 1066.

1242. PAULSON, R., AND S. HASTINGS. The relation between the alga and fungus of a lichen. Jour. Linn. Soc. London Bot. 44: 497-506. Pl. 21-22. 1920.—See Bot. Absts. 7, Entry 1994.

1243. PEASE, VINNIE A. Taxonomy and morphology of the ligulate species of the genus *Desmarestia*. Publ. Puget Sound Biol. Sta. 2: 313-367. Pl. 54-63. 1920.—One new species is erected, *Desmarestia herbacea*; and another announced., *D. latissima* Setchell & Gardner. There is a detailed discussion of the limits of these, and their relation to *D. tabacoides* Okamura; also a detailed discussion of the limits and history of *D. ligulata* (Lightfoot) Lamouroux and *D. herbacea* (Turner) Lamouroux. Details of the morphology of these 4 species clear up some fine points in their development and structure. Not finding reproduction the writer seems to doubt whether Okamura found it in *D. tabacoides*, and states that it may have been reproduction in a species of *Phycocelis* growing upon the *Desmarestia*.—T. C. Frye.

1244. PILGER, R. Algae Mildbraedianae Annabonenses. Bot. Jahrb. 57: 1-14. Fig. 1-34. 1920.—This is a list of the algae collected by Dr. J. MILDBRAED in 1911 on Annobon, the smallest of the Guinea Islands. Notes are given on distribution and critical features of morphology. Thirty-three species and varieties are included in the list of which the following are described as new: *Bryopsis densa*, *Struvea multipartita*, *Scinaia furcellata* (Turner) Biv. var. *constricta*, *Caulacanthus ustulatus* (Mert.) Kütz. var. *fastigiatus* (Kütz.) Pilger n. comb. (*C. fastigiatus* Kütz.), *Laurencia brachyclados*, *Herposiphonia brachyclados*, *Lophosiphonia adhaerens*, *Callithamnion Mildbraedii*, *Ceramium leptosiphon*.—K. M. Wiegand.

1245. PUYMALY, A. DE. Sur une petite algue verte aerophile (*Prasiola leprosa* Kütz.). [A small aerophilous alga (*Prasiola leprosa* Kütz.).] Compt. Rend. Acad. Sci. Paris 171: 189-192. 1920.—On the basis of the structure of the chromatophore and the normal reproduction by aplanospores it seems desirable to transfer the form referred to by PETERSEN as *Pleurococcus calcarius* to the species named in the title.—C. H. & W. K. Farr.

1246. RAINERI, R. Corallinacee del litorale tripolitano. [Corallinaceae of the Tripolitan littoral.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29¹: 282-288, 313-318. 1920.—The following algae collected by C. F. PARONA in 1912-13 were studied and described after the methods of Mme. LEMOINE: *Lithothamnium crispatum* Haucki, *L. Haucki* Rothpeltz, *L. Lemormandi* Areschoug, *L. Philippii* Foslie, *L. fruticulosum* (Kütz.) Foslie, *Lithophyllum expansum* Philippi, *L. Byssoides* Lamarck, *L. decussatum* Ellis and Solander, and *Melobesia Lejolisii* Rosan.—F. M. Blodgett.

1247. RAINERI, R. Corallinacee del litorale tripolitano. Nota III. [The Corallinaceae of the Tripolitan littoral.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29¹: 356-358. 1920.—Continuing from previous articles he describes the following species of calcareous algae collected by Prof. PARONA: *Corallina officinalis* Linn., *C. mediterranea* Areschoug, and *Peyssonelia rubra* Grey. The first 2 are new to the Tripolitan littoral.—F. M. Blodgett.

1248. SAUVAGEAU, C. Nouvelles observations sur l'Ectocarpus Padinae Sauv. [New observations on Ectocarpus Padinae Sauv.] Compt. Rend. Acad. Sci. Paris 171: 1040-1044. 1920.—A study of the reproductive structures of this parasite of *Padina Pavonia* reveals three sorts of plurilocular structures, namely, the megasporangia, the meiosporangia, and the antheridia. The meiosporangia and the megasporangia both produce spores which develop into plants directly. The spores of the megasporangia vary from planospores to aplanospores. These germinate without fecundation and hence the sperms are useless structures with no function in the life-history of the plants so far as is known. There are some indications that *Acinetospora pusilla* and *Ectocarpus Padinae* are different phases of the same life cycle, just as has been found in the Cutleriaceae and other families of the brown algae.—C. H. Farr.

1249. SCHRÖDER, B. Die neun wesentlichen Formentypen von Ceratium hirundinella O. F. Müller. [The nine fundamental form-types of Ceratium hirundinella.] Arch. Naturgesch. Abt. A. 84: 222-230. Fig. 1-9. 1918 [1920].—The author distinguishes, describes, and figures 9 forms falling within the limits of this species and discusses briefly types intermediate between these forms.—C. E. Allen.

1250. SCHRÖDER, BRUNO. Über Seebälle. [Concerning Pondballs.] Naturwissenschaften 8: 799-803. 1920.—The curious spherical growths of the algae *Aegagrophila*, *Spongomorpha*, *Valonia*, *Lithothamnium*, and *Rivularia*, as well as similar balls of animal origin are discussed in the above article.—O. L. Clark.

1251. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. The marine algae of the Pacific coast of North America, Part I, Myxophyceae. Univ. California Publ. Bot. 8: 1-138. Pl. 1-8. 1919.—The first part of the Marine Algae of the Pacific Coast of North America, comprising an account of the Myxophyceae, or blue-green algae, is presented by the authors without introduction or explanation, pending the publication of the other 3 parts. This part, otherwise, is complete in itself except as to an index. It has descriptions of the subclass, orders, families, genera, species, etc., together with citations of the literature, keys, distributional and critical notes. It contains no new species or new names.—W. A. Setchell.

1252. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. The marine algae of the Pacific coast of North America, Part II, Chlorophyceae. Univ. California Publ. Bot. 8: 139-374. Pl. 9-33. 1920.—This is the 2nd part of the account of the Marine Algae of the Pacific Coast of North America, issued by the authors under the same conditions and in the same form as the first [see next preceding entry]. It contains no new species or new names.—W. A. Setchell.

1253. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. Phycological contributions, I. Univ. California Publ. Bot. 7: 279-324. Pl. 21-31. 1920.—The following new genus, new species, and new combinations are proposed:—*Hormiscia doliifera* sp. nov., *Spongomorpha Mertensii* (Rupr.) comb. nov., *Capsosiphon fulvescens* (Ag.) comb. nov., *Enteromorpha groenlandica* (J. Ag.) comb. nov., *Monostroma areolatum* sp. nov., *Ulva stenophylla* sp. nov., *U. vexata* sp. nov., *U. angusta* sp. nov., *U. lobata* (Kuetz.) comb. nov., *U. expansa* (Setch.) comb. nov., *U. dactylifera* sp. nov., *U. taeniata* (Setch.) comb. nov., *Prasiola nevadensis* sp. nov., *P. meridionalis* sp. nov., *P. delicata* sp. nov., *Entocladia cingens* sp. nov., *E. codicola* sp. nov., *Internoretia* gen. nov., *I. Fryeana* sp. nov., *Pseudulvella prostrata* (Gardner) comb. nov., *Ps. applanata* sp. nov., *Ps. consociata* sp. nov., *Pseudopringsheimia apiculata* sp. nov., *Gomontia Bornetii* nom. nov., *G. habrorhiza* sp. nov., and *G. caudata* sp. nov.—W. A. Setchell.

1254. SMITH, GILBERT MORGAN. Phytoplankton of the inland lakes of Wisconsin. I. Myxophyceae, Phaeophyceae, Heterokontae, and Chlorophyceae exclusive of the Desmidiaceae. Bull. Wisconsin Geol. Nat. Hist. Survey 57. 243 p., 51 pl. 1920.—A detailed description of

the phytoplankton of Wisconsin lakes is presented. The species have been critically studied, and many new observations on life histories and variations are discussed. Keys to all the species are included. The following new species and varieties are described: *Crucigenia truncata*, *Selenastrum Westii*, *Echinosphaerella limnetica*, *Tetraedron victorieae* var. *major*, *Westella linearis*, *Volvox mononae*, *Chlamydomonas epiphytica*, *C. dinobryoni*, *Rhizochrysis limnetica*, *Gloethece linearis* var. *composita*, *Aphanocapsa elachista* var. *planctonica*, *Aphanocapsa endophytica*, *Merismopedia elegans* var. *major*, and *Chroococcus dispersus* var. *minor*.—E. N. Transeau.

1255. TILDEN, JOSEPHINE E. Bibliography of the literature relating to the Pacific Ocean algae and to the freshwater algae of the countries bordering upon the Pacific Ocean. 58 p. Privately published. 1920.—See Bot. Absts. 7, Entry 1606.

1256. VIIG, OLAF B. Brunalger og rødalger fra omegnen af Aalesund. [Brown and red algae from the vicinity of Aalesund, Norway.] Nyt Mag. Naturvidenskaberne 56: 167–176. 1919.—Notes are presented on distribution of algae found during summers of 1907 and 1909, chiefly on coast exposed to open sea.—A. Gundersen.

1257. WILLE, N. Algologische Notizen XXV–XXIX. [Algological notes.] Nyt Mag. Naturvidenskaberne 56: 1–60. 2 pl. 1919.—This series of notes deals with the following: The variability of *Scenedesmus bijugatus* and *S. obliquus*; the germination of aplanospores in *Coelastrum*; a list of the freshwater algae of Beeren Island; a change of the name *Lyngbya epiphytica* Wille to *L. Willei* Setchell & Gardner; and further study of Agardh's herbarium has led to additional synonyms for *Gloeocapsa sanguinea* Kütz., *Glaucocystis bullosa* (Kütz.) Wille, *Aphanocapsa mucicola* (Menegh.) Wille, *Gloeocapsa magma* Kütz., *Chroococcus aurantius* Wille, and *Tetraspora bullosa* Kütz.—E. N. Transeau.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 953, 976, 1066, 1211, 1224, 1291)

1258. BRITTON, ELIZABETH G. Bahama mosses. Bryologist 24: 17–19. Pl. 1. 1921.—A list of the mosses contributed to the Bahama flora, 33 species in 28 genera, is here printed for convenience of reference. *Hymenostomum flavescens* E. G. Britton is described and figured.—E. B. Chamberlain.

1259. BROTHERUS, V. F. Contribution à la flore bryologique de l'Ecuador. [Contribution to the moss flora of Ecuador.] Rev. Bryologique 47: 35–46. 1920.—The first part of this paper has already been abstracted (see Bot. Absts. 7, Entry 350). In this second and concluding part 63 species of mosses belonging to 11 families are listed with the usual full data regarding stations. The families most largely represented are the Hookeriaceae with 17 species, the Hypnaceae with 13, and the Sematophyllaceae with 11. The following species, 15 in all, are described as new: *Crossomitrium saprophilum*, *C. splendens*, *Cyclodiction Allionii*, *Hookeriopsis armata*, *Lepidopilum Allionii*, *L. argutidens*, *L. leucomioides*, *L. phyllophilum*, *L. subgracile*, *Pilotrichum armatum*, *P. longicaule*, *Pterogonium liliputanum*, *Rhynchostegium parvulum*, *Stereohyphnum oxyrrhynchioides*, and *S. rivulare*.—A. W. Evans.

1260. GARJEANNE, A. J. M. Gemmen bei *Gymnocolea inflata* Dum. [Gemmae of *Gymnocolea inflata*.] Hedwigia 61: 300–302. 1 fig. 1919.—The author reports the occurrence of gemmae in *Gymnocolea inflata*, a species which was supposed to lack them. The gemmae are angular, very pale yellowish green bodies, 20–40 μ in diameter, and composed of 2 unequal cells. They germinate readily and grow in the usual way. The gemmae are borne on the margins of rudimentary pale green leaves and appeared in a dried up culture which had been moistened and thus stimulated to renewed growth. It is questioned whether any of the Jungermanniae are really without gemmae.—D. Reddick.

1261. HERZOG, TH. Die Laubmoose der II. Freiburger Mulukkenexpedition. [The mosses of the second Freiburg expedition to the Molucca (Spice) Islands.] *Hedwigia* 61: 286-299. Pl. 3, 7 fig. 1919.—The collections here reported upon were made by K. DENIGER, director of the expedition, and E. STRESEMANN, who accompanied him as zoologist. Most of the specimens came from the islands of Ceram and Buru and from the Malayan peninsula. The total number of species listed is 66, of which the following are described as new: *Dicranoloma braunfelsioides* from Ceram; *Ctenidium moluccense* and *Hypnodendron caducifolium* from Buru; *Ectropothecium serratum*, *Homaliodendron pinnatelloides*, *H. intermedium*, and *Taxithelium Denigeri* from the Malayan peninsula. Fifteen of the other species, which bear Herzog's name as authority, had already been published in a paper dated 1916. In addition several new varieties, forms, and combinations are proposed. The species illustrated are *Hymenodontopsis Stresemannii* Herzog, the 2 new species of *Homaliodendron*, and *H. flabellatum* (Dicks.) Fleischer.—D. Reddick.

1262. HOLZINGER, JOHN M. On our American form of *Timmia megapolitana* Hedw. *Bryologist* 23: 86-88. Fig. 1-5. 1920.—The American specimens referred to *Timmia megapolitana* are shown to differ from the European in several respects. The leaves, for example, are less papillose and less serrate, the leaf-base is more hyaline, the antheridia are yellow, and the calyptra remains attached. The actual status of the American plant is at present undecided.—E. B. Chamberlain.

1263. HOLZINGER, JOHN M. Dixon and Watts on Antarctic mosses. [Rev. of: DIXON, H. N., AND W. W. WATTS. Mosses. Australasian Antarctic Expedition Sci. Rept. Ser. C. 7: 1-9. 1918 (see Bot. Absts. 7, Entry 1973).] *Bryologist* 23: 47. 1920.—The reviewer commends the conservative tendency of the authors in their treatment of the genus *Bryum*.—E. B. Chamberlain.

1264. LORCH, WILHELM. Über das Vorkommen von Calciumoxalatkrystallen in den Sporogonien von *Polytrichum commune* L. [On the occurrence of crystals of calcium oxalate in the sporogonia of *Polytrichum commune*.] *Hedwigia* 60: 342-349. 1919.—The presence of crystals of calcium oxalate in the capsules of *Polytrichum commune* is reported. Other species of *Polytrichum* examined failed to show them, and they have not been demonstrated in any other bryophytes. The crystals are most abundant in the epidermal cells of the spore-case but occur also in the columella, the walls of the spore-sac and the operculum. In discussing the structure of the capsule certain dorsiventral peculiarities are emphasized.—A. W. Evans.

1265. LUISTER, A. Les mousses de Madère. [Mosses of Madeira.] *Broteria Ser. Bot.* 18: 99-120. 1920.—The present article (the ninth of the series) contains analytic keys to all the families, genera, and species of mosses (through *Fissidens*), which occur in Madeira and the adjoining islands. The keys incorporate brief descriptions and have references to the author's previously published articles. [See Bot. Absts. 1, Entry 757; 3, Entries 2447, 2448; 6, Entry 156; 7, Entry 351].—E. B. Chamberlain.

1266. MACHADO, ANTÓNIO. Catálogo descritivo de Briologia Portuguesa. [Descriptive catalogue of Portuguese mosses.] 143 p. Lisbon, 1919.—This catalogue lists all the species and varieties of mosses occurring in Portugal. Of most species the author has seen authentic material; in the remaining cases he cites authoritative records. To facilitate determinations analytic keys based upon easily determined vegetative characters are included, and each species or variety is characterized in 4 or 5 lines of description in the body of the work. In all cases where fuller descriptions are not accessible in standard works, a foot-note gives the original description in full. The total census, omitting varieties, shows 7 species of Sphagnales, 4 of Andreaeales, and 313 of Bryales. The classification follows that of DIXON & JAMESON's Handbook. For each form there is a detailed statement of distribution for Portugal, definite localities and collectors being cited without generalized statements. Following the catalogue there is a glossary, a page of errata, a page of addenda, and a complete

index. The author has not hesitated to revive old names or to reduce species to varieties. There are in consequence over 20 new combinations, although no forms whatsoever are proposed as new. The new specific combinations proposed are the following, Machado being the authority in each case: *Camptothecium philippeanum* (Spruce), *Cinclidotus mucronatus* (Brid.), *Plagiopus ithyphyllus* (Brid.), *P. pomiformis* (Hedw.), *P. strictus* (Brid.), *Tortula meridionalis* (Luisier), and *Trichostomum humile* (Hedw.).—*E. B. Chamberlain.*

1267. MÖLLER, H. Beiträge zur Moosflora Javas, Straits Settlements und Birmas. [Contributions to the moss flora of Java, the Straits Settlements and Burma.] Hedwigia 60: 313–330. 5 fig. 1919.—The author enumerates 206 species of mosses which he collected in 1897, giving definite localities in each case. Of the species listed 194 came from Java, 28 from the Straits Settlements, and 14 from Burma, most of the species from the last 2 regions being recorded also from Java. Three of the Javan species are likewise listed from Sumatra. The specimens were all determined by V. F. BROTHÉRUS and the following 3 species, all from Java, are proposed as new on his authority and figured: *Acanthocladium scabrifolium*, *Rhizogonium salakanum*, and *Stereophyllum Mölleri*.—*A. W. Evans.*

1268. PEARSON, WM. HY. Aplozia Pendletonii Pearson. Bryologist 23: 84–85. Fig. 1–3. 1920.—This note completes the description of a species of hepatic recently proposed as new [see Bot. Absts. 7, Entry 352].—*E. B. Chamberlain.*

1269. PEARSON, WM. HY. Porella rivularis (Nees) Lindb. Bryologist 23: 85–86. 1920.—This note, which is based on material from Oregon collected by C. POTTER, deals with the synonymy and distinctive characters of the hepatic, *Porella rivularis*.—*E. B. Chamberlain.*

1270. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre Fissidens. [Observations on certain species of the genus Fissidens.] Rev. Bryologique 47: 33–35. 1920.—The earlier parts of the series to which the present paper belongs have already been abstracted (see Bot. Absts. 5, Entry 627; 6, Entry 158; 7, Entry 1975). In this part *Fissidens Monguilloni* Thériot and its occurrence in the French departments of la Mayenne and la Manche are discussed. The distinctive features of the species are described, several specimens from the departments in question are referred to it, and the opinion is advanced that it has a wider distribution than had been supposed.—*A. W. Evans.*

1271. POTIER DE LA VARDE, R. Sur le pédicelle du Stereophyllum Bremondii Th. et P. de la V. [On the seta of Stereophyllum Bremondii.] Rev. Bryologique 47: 35. 1920.—The seta of *Stereophyllum Bremondii* is smooth, while that of the closely related *S. Blatteri* is papillose. Through an oversight this distinction was not brought out in the original description of *S. Bremondii*. (See Bot. Absts. 7, Entry 1976.).—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 953, 1074, 1111, 1211, 1344, 1347, 1348, 1349, 1350, 1352, 1353, 1354, 1355, 1356, 1382, 1386, 1390, 1392, 1395, 1398, 1402, 1405, 1409, 1410, 1541)

FUNGI

1272. ADAMS, J. F. Observations on the infection of Crataegus by Gymnosporangium. Mycologia 13: 45–49. Fig. 1–4. 1921.—Ten species of *Crataegus* not previously reported as hosts for *Gymnosporangium germinale* and 6 not previously reported for *G. globosum* are included.—*H. R. Rosen.*

1273. ARTHUR, J. C. Nineteen years of culture work. *Mycologia* 13: 12-23. 1921.—A discussion of the writer's conception as to what criteria must be used in delimiting rust species, and an exposition of various changes in this conception as brought about by the gradually increasing knowledge of the rusts. Cultural work (infection experiments) was primarily undertaken to aid in a proper taxonomic treatment of species and the results of 19 years of such effort are shown to have aided (1) in completing the life cycles for many species, (2) in recognizing races within a species, and (3) in assuring a liberal point of view concerning the fixity of such features as open or covered telia, 1- or 2-celled teliospores (*Uromyces* and *Puccinia*), variation in number of the pores of the urediniospore, and in the position of these pores. By means of cultural work much progress was made in delimiting a number of distinct species among the grass rusts possessing sub-epidermal telia and in reducing to synonymy a large number of names. American *Carex* rusts, all of which had borne the names *Puccinia caricis* or *P. caricina*, were separated into a number of distinct species. The idea, held when the cultural work began, that hosts of any one species of rust would be found to be closely related was upset when it was shown that the aecial hosts of *Puccinia subnitens* belonged to a number of different families. The conception of species was further modified when it was found that collections of a single rust on different hosts show marked morphological differences. Cultures also showed that teliospores among the grass rusts are not necessarily resting spores. "The culture work began with the too prevalent idea that all rusts could be expected to conform in general to the well known *Puccinia graminis*. It closed with the conviction that the rusts are far too diversified in their morphology, their numerous characters, their physiological adaptations, and their range of hosts, to be represented by *Puccinia graminis* in more than one out of numerous aspects."—H. R. Rosen.

1274. ARTHUR, J. C. New species of Uredineae XII. Bull. Torrey Bot. Club 47: 465-480. 1920.—*Melampsora americana*, *Puccinia offuscata*, *P. senilis*, *P. gulosa* H. S. Jackson, *Uredo contraria*, *U. nitidula*, *Aecidium Ixorae*, *Ae. indecisum*, *Ae. Mitellae* Ellis & Ev., *Ae. sub-simulans* Arthur & Mains, *Ae. Betheli*, *Ae. arctoum*, *Ae. renatum*, *Ae. arcularium*, *Ae. Liabi*, *Ae. Batesii*, *Ae. Mesadeniae*, and *Ae. praecipuum* are described as new species. The following new names and new combinations are also given: *Pucciniastrum americanum* (Farl.) comb. nov., *Puccinia proximella* (Arth.) comb. nov., *P. hiascens* nom. nov., *P. Heterisiae* H. S. Jackson nom. nov., *Uromyces imperfectus* nom. nov., and *Uredo laticolor* nom. nov.—P. A. Munz.

1275. BAL, S. N. Commentationes Mycologicae. 8. *Pseudoperonospora cubensis* (B. & C.) Roxten, on *Trichosanthes dioica* Roxb. Jour. Dept. Sci. Calcutta Univ. 3: 1-3. 4 fig. 1920.—The first record of the fungus from Bengal. A short description is given.—Winfield Dudgeon.

1276. BAL, S. N. Commentationes Mycologicae. 9. *Cercospora personata* (B. & C.) Ellis, on *Arachis hypogaea* Linn. Jour. Dept. Sci. Calcutta Univ. 3: 4-6. 4 fig. 1920.—A record of the occurrence of the fungus in Bengal.—Winfield Dudgeon.

1277. BAL, S. N., AND K. G. BANERJEE. Commentationes Mycologicae. 10. *Rhinocladium corticolum* Mass., on the bark of *Mangifera indica* Linn. Jour. Dept. Sci. Calcutta Univ. 3: 7-8. 5 fig. 1920.—A record of the occurrence of the fungus in Bengal.—Winfield Dudgeon.

1278. BARLOT, J. Sur de nouvelles réactions colorées utilisables pour la diagnose d'especes mycologiques. [On new color reactions useful in distinguishing species of fungi.] Compt. Rend. Acad. Sci. Paris 171: 1014-1016. 1920.—An aqueous solution of potash in 20-40 per cent concentration is recommended. It can be used to distinguish the poisonous *Mycena pura* from the edible *Laccaria laccata*, the former giving a yellow and the latter a dark brown color. *Gomphidius viscidus* gives a violet brown, *G. glutinosus* a feeble yellowish brown, and *Amanita junquilla* an orange yellow color; and *Lactarius turpis* yields a variety of color reactions with various acids and alkalies.—C. H. Farr.

1279. BLASDALE, WALTER C. A preliminary list of the Uredinales of California. Univ. California Publ. Bot. 7: 101-157. 1919.—A list of the rusts of California intended to assist collectors in naming new collections and to tabulate all the known forms and their host plants. Some 236 species or forms are enumerated, arranged under the genera according to the families of the host-plants they inhabit.—W. A. Setchell.

1280. BONAR, LEE. Wilt of white clover, due to *Brachysporium trifolii*. Phytopath. 10: 435-441. 3 fig. 1920.—A disease of the foliage of white clover, *Trifolium repens*, found on a lawn near Washington, D. C., is described. Some cultural characters and a technical description of *Brachysporium trifolii* Kauffman are given.—F. R. Jones.

1281. BRITTON, NATHANIEL LORD, AND CHARLES FREDERICK MILLSPAUGH. The Bahama Flora. Roy. 8vo., viii + 695 p. Published by the authors: New York, June 26, 1920.—See Bot. Absts. 7, Entry 1429.

1282. BROWN, NELLIE A. A *Pestalozzia* producing a tumor on the sapodilla tree. Phytopath. 10: 383-394. 5 fig. 1920.—This disease occurred in Buena Vista, Florida. The results of inoculation both upon sapodilla and upon other hosts are reported. The spores are described. Favorable media are mentioned. Comparison with other tumor-forming species of *Pestalozzia* indicates that this is a separate species. The name *Pestalozzia scirrofaciens* n. sp. is suggested. Control consists of destruction of infected trees.—Ruth G. Bitterman.

1283. CHURCH, MARGARET B. Laboratory experiments on the manufacture of Chinese Ang Khak in the United States. Jour. Indust. Eng. Chem. 12: 45-46. 1920.—The characteristics of red rice are due to a mold, *Monascus purpureus*.—Henry Schmitz.

1284. CLELAND, J. BURTON, AND EDWIN CHEEL. Australian Fungi: Notes and descriptions. No. 2.—The Sclerotia-forming polypores of Australia. Trans. and Proc. Roy. Soc. South Australia 43: 11-22. Pl. 1-5. 1919.—There is brought together within the limits of the article all that is known of the sclerotial forms of polypores of Australia. Two are described as possessing true sclerotia: *Polyporus mylittae* Cooke and Massee and *Polyporus minor-mylittae*. Two are described as possessing false sclerotia: *Polyporus tumulosus* Cooke and *Polyporus basilapiloides* (McAlp. and Tepper). The article is accompanied by photographs of sclerotia and of sclerotia to which fruiting bodies are attached. [See also Bot. Absts. 4, Entry 1070; 8, Entry 1285.]—J. H. Faull.

1285. CLELAND, J. BURTON, AND EDWIN CHEEL. Australian fungi: Notes and descriptions. No. 3. Trans. and Proc. Roy. Soc. South Australia 43: 262-315. Pl. 28-29. 1919.—This paper is a continuation of two previous ones on Australian fungi. The following species are described as new: *Amanitopsis punctata*, *Clitocybe paradisopa*, *Cantharellus lilacinus*, *C. imperatae*, *C. nigripedes*, *C. corrugatus*, *Russula Flocktonae*, *R. erumpens*, *Mycena banksiae*, *M. coccineus*, *Pleurotus subostreatus*, and *Boletus scarlatinus*. [See also Bot. Absts. 4, Entry 1070; 8, Entry 1284.]—J. H. Faull.

1286. COUTINHO, ANTONIO XAVIER PEREIRA. Eubasidiomycetes Lusitanici Herbarii Universitatis Olisiponensis. [Eubasidiomycetes of Portugal represented in the herbarium of the University of Lisbon.] 195 p. Manuel Lucas Torres: Lisbon, 1919.—A taxonomic paper giving descriptions of all the Eubasidiomycetes of Portugal as represented in the herbarium of the University of Lisbon. The paper is not illustrated. It is provided with keys to the genera. A total of 511 species is included.—H. M. Fitzpatrick.

1287. DAVIS, J. J. [Note under "Notes and Brief Articles."] Mycologia 13: 58. 1921.—Records 30 collections of *Pucciniastrum arcticum* from Wisconsin, all on *Rubus triflorus*.—H. R. Rosen.

1288. DIEHL, WILLIAM W. The fungi of the Wilkes Expedition. Mycologia 13: 38-41. 1921.—Attention is called to 8 species of fungi described as new by Berkeley and Curtis, most of which heretofore have been overlooked.—H. R. Rosen.

1289. DUFRENOY, JEAN. The occurrence of *Actinomyces*-like endotrophic mycorrhiza. *New Phytol.* 19: 40-43. *Fig. 1-5.* 1920.—*Actinomyces* is held responsible for 2 cases of endotrophic mycorrhiza. This conclusion demands for proof further investigation of the cases and also a precise definition of the genus *Actinomyces*. Descriptions are given of the morphology and staining reactions of the mycorrhiza.—I. F. Lewis.

1290. FINK, BRUCE, AND SYLVIA C. FUSON. Ascomycetes new to the flora of Indiana. *Proc. Indiana Acad. Sci.* 1918: 264-275. 1920.—The authors list 135 species distributed among 43 families, with host or substratum and county. Many of these Ascomycetes are associated with algae in lichens. Two species, *Pyrenopsis fuscoatra* Fink sp. nov. and *Verrucaria sordida* Fink sp. nov., are new.—F. C. Anderson.

1291. FISCHER, L. Tabellen zur Bestimmung einer Auswahl von Thallophyten und Bryophyten. [Keys for the determination of a selected group of thallophytes and bryophytes.] 60 p. Bern, 1918.—This series of keys was prepared for the use of students in the University of Bern. The first edition appeared in 1898 and the second in 1903. After the death of the author, a revised edition was published by his son, E. FISCHER, in 1910, and the present publication is the second edition of the revision. Representatives of the myxomycetes, bacteria, algae, fungi, liverworts, and mosses are included, more attention being given to the fungi than to any other group.—A. W. Evans.

1292. FRIES, THORE C. E. Bidrag til Tromsø Amts gasteromycetflora. [Contribution to the flora of gasteromycetes of Tromsø Amt, Norway.] *Bergens Mus. Aarbok Naturv.* Raekke 1917-18: 10 p. 1920.—Notes on species of Lycoperdaceae and Nidulariaceae. *Calvatia saccata* (Vahl) Morg. var. *alpina* n. var. is given.—A. Gundersen.

1293. GODFREY, G. H. *Sclerotinia Ricini* n. sp. on the castor bean (*Ricinus communis*). *Phytopath.* 9: 565-567. *Pl. 40-41.* 1919.—A hitherto undescribed species of *Botrytis*, causing a serious disease of the castor bean, is shown to be the conidial condition of a species of *Sclerotinia* which is here described as *S. Ricini* n. sp. The *Botrytis* was repeatedly obtained from single ascospore isolations.—H. M. Fitzpatrick.

1294. GROVE, W. B. Mycological notes, V. *Jour. Botany* 58: 249-251. 1920 (continued from *Jour. Botany* 57: 210. 1919, and to be continued).—The writer presents additional notes on *Russula claroflava* Grove, and a revised description of that species. It was found to grow always on grassy ground among trees on the borders of a sphagnum bog. *Boletus sanguineus* Withering was rediscovered by the writer, and a description is given. It is noted that a certain number of closely related species would be better treated as subdivisions of a comprehensive species, e.g., *B. chrysenteron*. *Monilia candicans* Sacc. is redescribed from a specimen obtained in Cofton Park. It is probably the same as *Monilia caespitosa* Relh. about which there has been much doubt. The statement of authors that the spores are in ternate spikes is misleading, as ternate spikes are only occasional. A brief note in correction of "Mycological notes IV" is appended. The corrections concern an unnamed species of *Phyllosticta*, and *Sphaerulina intermixta* f. *valde-evoluta*.—K. M. Wiegand.

1295. HERRMANN, EMIL. Pilzschadlinge an Drogen. [Fungi detrimental to drugs.] *Pharm. Zentralhalle* 61: 95-100. 1920.—A detailed study of the action of various kinds of fungi on drugs. The forms enumerated include Myxomycetes, Peronosporaceae, Perisporiaceae, Ustilaginales, Uredinales, Exobasidiales, and Exoascaceae.—H. Engelhardt.

1296. JONES, FRED RUEL, AND CHARLES DRECHSLER. Crownwart of alfalfa caused by *Urophlyctis alfalfae*. *Jour. Agric. Res.* 20: 295-323. *Pl. 47-56.* 1920 [1921].—Crownwart has been known in the United States for about 10 years. It is still confined to Pacific slope sections and is not a serious disease. *Urophlyctis alfalfae* seems to be limited to *Medicago sativa* and *M. falcata*. The disease originates in infection of very young buds in early spring; the foliar elements of these develop into abnormalities not involving the mature structures of

root or stem. In the presence of abundant moisture, the galls complete development in early summer; most of them decay rapidly but some live over winter. The fungous body consists of turbinate cells and resting spores. At all stages of development of the gall characteristic masses of brown resting spores are present. The first turbinate cell is the immediate development of the infecting body and becomes polynucleate; from this uninucleate peripheral segments are cut off at the apex. A hyphal structure of limited growth develops from each of these; its expanded nucleate termination constitutes the turbinate cell of the next succession. At its mature stage the turbinate cell bears a branched apical haustorium, the axis of which proliferates at its tip a globose expansion into which the polynucleate protoplasm passes to produce the resting spore; the latter is characterized by 9 to 15 branched haustoria zonately arranged, or only by scars of these when ripe. No evidence of any sexual process in the production of these spores was found.—The abundant development of the disease is associated with excessive soil moisture during the infection period and control measures leading to reduction of soil moisture at this time are indicated.—*F. Weiss.*

1297. KEISSLER, KARL VON Revision des Sauterschen Pilzherbars. [Revision of Sauter's fungus herbarium.] Ann. Naturhist. Hofmus. Wien 31: 77-138. 1917.—There is a list of Sauter's mycological publications and an introduction. The special part consists of 3 subdivisions: (1) A list of Sauter's species based upon types in his herbarium, (2) a list of Sauter's species of which there are no specimens in the herbarium, and (3) a list of species other than Sauter's of which there are specimens in the herbarium. Several herbarium names credited to Sauter are given but are not accompanied by formal descriptions. *Peziza alboflava* Saut. (*Lachnea alboflava* Sacc.) is technically a new combination concerning which there is a note. The list is amply annotated.—*A. S. Hitchcock.*

1298. KOPS, JAN, F. W. VAN EEDEN, EN L. VUYCK. Flora Batava. Afbeelding en beschrijving der Nederlandsche gewassen. [Flora Batavia. Illustrations and descriptions of plants of Holland.] Parts 400-401. Folio, pl. 1993-2000 [colored]. Martinus Nijhoff: 's-Gravenhage, 1920.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The non-vascular plants are: *Inocybe fastigiata* Schaef., *Tricholoma cerinum* P., *Lepiota cinnabarina* Schwein., *Peniophora quercina* Cooke, *Cortinarius* (*Myrascium*) *vibratilis* Fr., *Marasmius prasiosmus* Fr., and *Clitocybe claviceps* P. [See also Bot. Absts. 1, Entry 635; 5, Entry 2347; 7 Entry 1457; 8, Entry 1541.]—*J. M. Greenman.*

1299. LEIBY, R. W. The larger corn stalk borer. Bull. North Carolina Dept. Agric. 41¹³: 5-85. 27 fig. 1920.—Several fungus parasites are mentioned in the discussion of the biology of this insect. These include *Isaria barberi* Gd., *Hirsutella* sp., and *Metarrhizium anisopliae* (Metsch.) Sor.—*F. A. Wolf.*

1300. MAYOR, EUGEN. Notes mycologiques. [Mycological notes.] Bull. Soc. Neuchâteloise Sci. Nat. 42: 62-113. 1916/17 [1918].—Parasitic fungi of Neuchâtel. *Puccinia centaureae-rhapontici* on *Centaurea rhaponticum* is new. *Aecidium* on *Crepis biennis* is connected with *Puccinia pentasiti-pulchellae* Lüdi, and that on *Helleborus foetidus* with *Melampsora abieticaprearum* Tub. [Through Abst. by MATOUSCHEK in Zeitschr. Pflanzenkrankh. 30: 147. 1920.]—*D. Reddick.*

1301. MEINECKE, E. P. Facultative heteroecism in *Peridermium cerebrum* and *Peridermium harknessii*. Phytopath. 10: 270-297. 2 fig. 1920.—Additions to the California host lists of *Peridermium cerebrum* and *Cronartium cerebrum* are reported. Direct infections have resulted from inoculations of several species of pine with aeciospores of *Peridermium cerebrum*. *P. harknessii* Moore retains its ability to produce uredinia and telia on scrophulariaceous hosts, but, in addition, the aeciospores produce galls and aeciospores on the several species of pine tried. The resulting aeciospores germinate like true aeciospores. The heteroecism of *P. cerebrum* and *P. harknessii* is facultative.—*G. Wineland.*

1302. OVERHOLTS, L. O. Some New Hampshire fungi. *Mycologia* 13: 24-37. 1921.—A list of 195 species of fungi under 77 different genera collected mainly by the writer, the Eu-Basidiomycetes being best represented. Hosts or substrata, and locality are given under each species.—H. R. Rosen.

1303. [PENNEL, FRANCIS W.] Index to American mycological literature. *Mycologia* 13: 62-65. 1921.

1304. PUTTEMANS, ARSENE. *Gloeosporium Bombacis*, n. sp. *Bull. Soc. Path. Veg. France* 7: 74-75. 1920.—This fungus was found in the vicinity of Sao Paulo, Brazil, on the bark of young shoots of *Bombax* (*Pachyra*) *insignis*, forming irregular, clear, brown spots later becoming darker. On these spots were found acervuli of what appears to be an undescribed *Gloeosporium*. The bark on the affected shoots becomes light colored and hard. New shoots arise below the diseased ones and these soon become affected with disease. A technical diagnosis of the fungus is given.—C. L. Shear.

1305. RABAK, F. The effect of mold upon the oil of corn. *Jour. Indust. Eng. Chem.* 12: 46-48. 1920.—The spoilage of corn from the growth of mold is noticeably manifested in connection with the fatty oil.—Henry Schmitz.

1306. RAMSBOTTOM, J. Canvas-destroying fungi. *Nature* 105: 563-564. 1920.—War experiences have shown this to be an important question, especially on "flax made" canvas. Short account of investigations by W. BROUGHTON-ALCOCK in Malta, Italy (*Journal of Royal Army Medical Corps*, Dec., 1919), shows species of *Macrosporium* and *Stemphylium* to be principal agents. Variation in color of spots due to representatives of several other genera. Mycelium was found in canvas ready for making into tents, and it is suggested that its development began during the retting process (not found on new cotton canvas). Willesden method (cuprammonium) and "cutch" treatment prevented growth of fungi. Soft soap, 1 to 5000 solution, followed by a mixture of 1 per cent alum and CuSO_4 greatly inhibited growth and gave good results at Malta. Author states that in Saloniki sodium chromate proved superior to these.—O. A. Stevens.

1307. RAMSBOTTOM, J. [Rev. of: CHURCH, A. H. Elementary notes on the morphology of fungi. *Bot. Mem.* [Oxford] 7. 29 p. 1920.] *Jour. Botany* 58: 181. 1920.

1308. ROBERTS, J. W. *Clitocybe sudorifica* as a poisonous mushroom. *Mycologia* 13: 42-44. 1921.—Detailed symptoms of poisoning due to *Clitocybe sudorifica*, which thus far has been distinguished from *C. dealbata* only by its effects on the mycophagist.—H. R. Rosen.

1309. SALISBURY, E. J. Botany. *Sci. Prog.* [London] 15: 31-34. 1920.—A review of work done on *Actinomyces*.—J. L. Weimer.

1310. SEAVER, FRED J. Fungi [Moulds, blights, and mushrooms], in Britton's "Flora of Bermuda," p. 479-489. 1918.—The author of this chapter presents a general account of the fungi of Bermuda with notes on the various groups and species included. Reference is made to the "Memoirs of the New York Botanical Garden" for August, 1916, where a complete list of the fungi of Bermuda is recorded. No new species of fungi are described in the present volume. [See Bot. Absts. 8, Entries 687, 1320.]—J. M. Greenman.

1311. STAKMAN, E. C., AND L. J. KRAKOVER. *Puccinia graminis* on native *Berberis canadensis*. *Phytopath.* 10: 305-306. 1920.—*Puccinia graminis* was observed for the first time naturally infecting *Berberis canadensis*, the infection being distributed over 8 counties and found spreading to alternate hosts.—E. K. Seymour.

1312. STEVENS, F. L. *Perithecia* with an interfascicular pseudoparenchyma. *Bot. Gaz.* 68: 474-476. *Pl.* Dec., 1919.—A Porto Rican fungus, collected on *Bromelia pinguin*, shows upon examination a pseudoparenchyma occupying the center of the perithecium, instead

of the usual cavity partially filled by asci and paraphyses. This condition suggests the situation in *Penicillium* or in the Plectascineae, except that here the asci arise at the base of the ascocarp. The fungus therefore is placed in a new genus, *Desmotascus*, and the species is named *D. portoricensis*.—*H. C. Cowles*.

1313. TISDALE, W. B. Iris leaf spot caused by *Didymellina iridis*. *Phytopath.* 10: 148-163. 6 fig. 1920.—The causal fungus, usually known in its conidial state as *Heterosporium gracile*, is traced through its life cycle, and its taxonomy, morphology, and host relationships are considered in detail. The removal of dead infected leaves in spring before new foliage appeared controlled the disease.—*F. R. Jones*.

1314. TORREND, C. Les Polyporacées du Brésil: Polypéracées stipitées. [Stipitate Brazilian polypores.] *Broteria: Ser. Bot.* 18: 121-143. Pl. 5-8. 1920.—The article contains a key to the Brazilian genera of stipitate polypores, a discussion of 34 species of the genus *Amauroderma*, and a key for separation of the species. Each species is given a brief technical description in addition to less formal observations. *A. Gusmanianum*, *A. picipes*, and *A. Mosselmanii* are proposed as new. Photogravure plates illustrate the gross characters of 11 species, or varieties.—*E. B. Chamberlain*.

1315. WEIDMAN, FRED D. *Penicillium brevicaule* var. *hominis* Saccardo 1877, Brumpt and Langeron, 1910, in an American case of ringworm of the toes. *Arch. Dermatol. and Syphilol.* 2: 703-715. Fig. 1-14. 1920.

LICHENS

1316. BACHMANN, E., AND FR. BACHMANN. Litauische Flechten. [Lithuanian lichens.] *Hedwigia* 61: 303-342. 1919.—Collections made in vicinity of Lake Narotsch, 55°N., 27°E. First 12 pages devoted to physiographic, climatological, and plant geographic features of the region with observations on the lichen vegetations of different substrata—soils, stones, trees, etc.—The 204 species found are arranged in systematic order and aside from localities there are brief notes on many species. *Acarospora globosa* (Koerb.) is described fully.—Many species which usually are sterile were found fruiting abundantly. Six lichen parasites are mentioned. A comparison with other lichen floras is included.—*D. Reddick*.

1317. DURIETZ, G. EINAR. Några lavar från det 16:e skandinaviska naturforskarsmötets excursion i Bergens skärgård. [Some lichens from the excursion of the 16th meeting of the Scandinavian naturalists among islands near Bergen.] *Bergens Mus. Aarbok Nat. Raekke* 1917-1918: 26-29. 1920.—An annotated list of species.—*A. Gundersen*.

1318. FINK, BRUCE, AND SYLVIA C. FUSON. Ascomycetes new to the flora of Indiana. *Proc. Indiana Acad. Sci.* 1918: 264-275. 1920.—See *Bot. Absts.* 8, Entry 1290.

1319. MERESCHKOVSKY, CONST. Le *Parmelia camtschadalis* existe-t-il? [Does *P. camtschadalis* exist?] *Hedwigia* 61: 303-307. 1919.—A polemic dedicated to V. P. Savicz. The type is in the herbarium of the Conservatoire Botanique at Geneva.—*D. Reddick*.

1320. RIDDLE, LINCOLN W. Lichenes, in Britton's "Flora of Bermuda," p. 470-479. 1918.—The author of this chapter presents in systematic order a general account of the lichens, with brief notes on salient characters of the families and species represented. Reference is made to a previous article on the Bermuda lichen flora in the "Bulletin of the Torrey Botanical Club" for April, 1916, where an enumeration of these lichens is given with descriptions of new species and varieties. [See *Bot. Absts.* 1, Entry 1062; 8, Entries 687, 1310.] —*J. M. Greenman*.

1321. SHIRLEY, JOHN. The thallus of the genus *Parmelia*. *Papers and Proc. Roy. Soc. Tasmania* 1918: 53-68. 1919.

BACTERIA

1322. ANONYMOUS. [Rev. of: GUERNEY-DIXON, S. *The transmutation of bacteria*. xviii + 179 p. University Press: London, 1919.] *Nature* 105: 131-132. 1920.—“Deals with certain variations, morphological and physiological, which are encountered amongst pathogenic bacteria. *** mainly a study of bacteriological literature in the English language.”—O. A. Stevens.

1323. ANONYMOUS. [Rev. of: TANNER, F. W. *Bacteriology and mycology of foods*. vi + 592 p. John Wiley & Sons, New York, Chapman & Hall, London: 1919.] *Sci. Prog.* [London] 15: 160. 1920.

1324. B[ERGEY], D. H. [Rev. of: HORT, EDWARD C. *The reproduction of aerobic bacteria*. *Jour. Hygiene* 18: 369-408. *Pl.* 4-7. 1920.] *Absts. Bact.* 4: Entry 893. 1920.—Hort's definition of involution forms of bacteria (“An involution form of bacterium can only mean a bacterium which is undergoing retrogressive, or perhaps, degenerative changes. It is strictly speaking, a sterile organism which is not only incapable of maintaining its reproductive activity, but is also incapable of maintaining its integrity of form.”) is at variance with the usual conception of what is meant by the term involution form as it includes also what is commonly meant by the term degeneration form. Hort studied *Bacillus typhosus* in 4 per cent glucose broth and 4 per cent glucose agar. These media are too high in sugar and become too acid for normal nutrition. “Any opinion formed on the modes of reproduction of bacteria when placed under such abnormal conditions must be accepted with great caution.” Hort's conclusion that bacteria multiply not only “by the simple process of transverse binary fission into two equal parts,” but that “under certain circumstances the lower bacteria are able to reproduce themselves by the production of fertile branches and buds, and by endogenous production of gonidial bodies, in addition to the more familiar method of equal binary fission,” is questioned because “it is evident that any alteration of the osmotic tension of culture media will affect the normal process of fission, but these abnormal figures, which everyone has seen, should not be regarded as being modes of reproduction as Hort believes, but rather, abortive attempts of fission.” [See also *Bot. Absts.* 8, Entry 1328.]—D. Reddick.

1325. CONN, H. J., AND R. S. BREED. A suggestion as to the flagellation of the organisms causing legume nodules. *Science* 51: 391. 1920.—For some time there has been dispute as to whether legume nodule organisms have 1 or several flagella. BURRELL and HANSEN claimed that they were monotrichic, whereas various others have observed peritrichic flagella. HANSEN now says that he, too, has found peritrichic flagella in cultures from clover, vetch, and alfalfa. Hence he suggests that there may be 2 different groups. The question is raised by the authors whether the cowpea and soy bean organisms may not be monotrichic in young cultures and peritrichic when they are older.—A. H. Chivers.

1326. ELLIS, DAVID. Iron-depositing bacteria. [Rev. of HARDER, EDMUND CECIL. *Iron depositing bacteria and their geologic relations*. U. S. Geol. Surv. Professional Paper 113. 89 p., *pl.* 1-12, *fig.* 1-14. 1919.] *Nature* 105: 727. 1920.

1327. H., R. T. [Rev. of: ELLIS, D. *Iron bacteria*. xix + 179 p., 5 *pl.* Methuen and Co.: London, 1919.] *Nature* 105: 323. 1920.

1328. HORT, EDWARD C. *The cultivation of aerobic bacteria from single cells*. *Jour. Hygiene* 18: 361-368. 1 *fig.* 1920.—Each of the present methods of isolating single cells (Indian ink, squared coverslip, capillary tube, droplet, and Barber methods) is unsatisfactory. Objections to each method are stated.—For immersion lens examination the following method is found effective: Etch small rings on coverslips; sterilize slips and slides; spread a thin layer of agar on the slides; prepare a dilute culture and place the smallest possible droplet of it in the center of a ring; invert slips on the slide and examine to see whether a single cell is present or not; slides bearing a single organism are incubated and examined at fre-

quent intervals until a colony has developed from which tube cultures may be secured.—When the object is simply to secure a pure culture from a single cell the following method is used: Spread hot nutrient agar over sterilized glass slides; when cool, inoculate from a dilute culture by means of a glass rod; cover the agar with a thin sheet of perforated celluloid; place sterilized coverslips over the perforations and incubate; examine the circlets of medium in the minute moist chambers until one is found which contains a single cell; center the colony in the field, replace the lens with an accurately centered needle (method described), touch the colony, and transfer in the usual way; examine to see that the colony has been touched. [See also Bot. Absts. 8, Entry 1324.]—*D. Reddick*.

1329. HORT, EDWARD C. **The reproduction of aerobic bacteria.** Jour. Hygiene 18: 369–408. Pl. 4–7. 1920.—A culture of *Bacillus typhosus* was secured from a single cell and studied in 4 per cent glucose broth or 4 per cent glucose agar. Numerous types of organisms, which are illustrated, developed in the cultures. This supports conclusions previously published that the lower bacteria are able to reproduce themselves “by the production of fertile branches and buds, and by the endogenous production of gonidial bodies, in addition to the more familiar method by equal binary fission.” These are not regarded as involution forms. The latter are defined as “strictly speaking, a sterile organism which is not only incapable of maintaining its reproduction activity, but is also incapable of maintaining its integrity of form.”—Part 2 (p. 382 to 407) is entitled “the effect of the reproductive life of bacteria on the agglutinability of bacterial emulsions.” [See Bot. Absts. 8, Entry 1324.]—*D. Reddick*.

1330. KAWAKAMA, KOICHIRO, AND SUEHIRO YOSHIDA. **Bacterial disease on *Milletia* plant. (*Bacillus milletiae* n. sp.)** Bot. Mag. Tôkyô 34: 110–115. Pl. 2. 1920.—See Bot. Absts. 7, Entry 1190.

1331. KOSER, STEWART A. **A bacteriological study of canned ripe olives.** Jour. Agric. Res. 20: 375–379. 1921.—In a bacteriological examination of 480 commercial containers of ripe olives, living microorganisms were found in practically every sample which showed either a “swelled” condition or had a bad odor. Sixteen different kinds of organisms were found. Bacteria were commonest, members of the colon group predominating.—Viable organisms were found in a small percentage of containers which were “normal.” “These were either aerobic, spore-forming bacilli, cocci or apparently dormant members of the colon group.”—*D. Reddick*.

1332. LÖHNIS, F., AND ROY HANSEN. **Nodule bacteria of leguminous plants.** Jour. Agric. Res. 20: 543–555. Pl. 68–69. 1921.—The nodule bacteria of leguminous plants can be divided into 2 groups. Each group is distinct, morphologically as well as physiologically. The bacteria of the 1st group, which the authors consider to be *Bacillus radicola* Beijerinck, are peritrichic, grow with relative rapidity on agar plates, and produce very characteristic changes in milk. They produce nodules on the roots of the following plants: Clover, sweet clover, alfalfa, vetch, pea, navy bean, lupine, black locust, *Amorpha*, and *Strophostyles*. The bacteria of the 2nd group are monotrichic, grow slowly on agar plates, and cause no marked change in milk. They have been isolated from cowpea, soybean, peanut, beggar weed, *Acacia*, *Genista*, and *Cassia*. The nomenclature of this latter group is discussed. *Bacillus radiobacter* Beijerinck isolated from legume nodules was studied with the 2 groups of nodule forming bacteria.—*W. H. Burkholder*.

1333. MILLER, H. M. **Modification of the Howard method for counting yeasts, spores and bacteria in tomato products.** Jour. Indust. Eng. Chem. 12: 766. 1920.—The modification described is based on the fact that by boiling tomato pulp with Loeffler's methylene blue and Tiehl-Neilsen's carbolfuchsin the microorganisms are stained a slightly deeper color than the tomato tissues.—*Henry Schmitz*.

1334. TRUFFAUT, G., ET N. BEZSSONOFF. **Sur les caracteres communs au *Bacterium* β , symbiote du *Clostridium* *Pastorianum* de Winogradsky, et au *B. aliphaticum* non liquefaciens**

de Tausz et Peter. [On the characters common to *Bacterium* β , the symbiont of *Clostridium* *Pastorianum* of Winogradsky and *Bacterium* *aliphaticum non liquefaciens* of Tausz and Peter.] *Compt. Rend. Acad. Sci. Paris* 171: 1089-1091. 1920.—A comparison is made between the morphological and physiological characteristics of *Bacillus* β , which is a symbiont of *Clostridium pastorianum*, with those of *Bacillus aliphaticum non-liquefaciens*. The conclusion is reached that they are either closely related strains of the same species or that they are the same strain. The chief points of distinction seem to be such as are related to the life habits of the two, symbiosis in the one case and independent development in the other.—*C. H. Farr.*

1335. WINSLOW, C.-E. A., JEAN BROADHURST, R. E. BUCHANAN, CHARLES KRUMWIEDE, JR., L. A. ROGERS, AND G. H. SMITH. The families and genera of the bacteria. Final report of the committee of the Society of American Bacteriologists on characterization and classification of bacterial types. *Jour. Bact.* 5: 191-229. 1920.—The report is divided into 4 sections. In section I, the introduction, reference is made to the preliminary report of the Committee in 1917 and the changes made in that report are noted, namely, (1) the family Mycobacteriaceae has been elevated to the rank of an order, Actinomycetales, with 2 families, Actinomycetaceae and Mycobacteriaceae; to the first family have been added 2 genera, *Actinobacillus* and *Erysipelothrix*, the genus *Nocardia* having been omitted; to the second family has been added the genus *Pfeifferella*. (2) The family Nitrobacteriaceae has been divided into 2 tribes and the name of the genus *Mycoderma* has been changed to *Acetobacter*. (3) In the Coccaceae the genus *Neisseria* has been placed in a separate tribe; the genus *Albococcus* is united with *Staphylococcus*; and the new genera *Diplococcus* and *Leuconostoc* are added. (4) The Bacteriaceae are divided into 7 tribes and the new genera *Erythrobacillus*, *Chromobacterium*, *Zopfius*, and *Proteus* are added. (5) The family Lactobacillaceae is reduced to the rank of a tribe of the Bacteriaceae. In section II are given some specific recommendations, including a list of 16 genera the names of which are recommended for adoption. In section III is given the outline of bacterial classification, including characteristics of the orders, families, tribes, and genera; 38 genera are included with the name of the type species for each genus. Section IV contains an artificial key to the families and genera. Section V consists of a generic index of the commoner forms of bacteria with the names of the common species annexed to their proper generic names.—*Chester A. Darling.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 1088, 1101)

1336. BERRY, E. W. Contributions to the Mesozoic flora of the Atlantic Coastal Plain XIV. Tennessee. *Bull. Torrey Bot. Club* 48: 55-72. 1921.—An account of a flora of 135 species of plants recently discovered in the Ripley formation of western Tennessee. The Ripley formation is the latest of the Upper Cretaceous formations of the Mississippi embayment region. The report includes an account of the botanical character, the probable environment, and the correlation of the flora, and gives a list of the forms represented.—*E. W. Berry.*

1337. HARSHBERGER, J. W. Upper Cretaceous floras. [Rev. of: BERRY, E. W. Upper Cretaceous floras of the eastern gulf region in Tennessee, Mississippi, Alabama and Georgia. U. S. Geol. Surv. Prof. Paper 112. 178 p., 33 pl. 1919 (see Bot. Absts. 3, Entry 1600).] *Bot. Gaz.* 68: 482-483. 1919.

1338. HEIM, ARNOLD, AND H. GAMS. Interglaziale Bildungen bei Wildhaus (Kt. St. Gallen). [Interglacial deposits at Wildhaus (Canton St. Gall).] *Vierteljahrsschr. Naturf. Ges. Zurich* 63: 19-33. 1918.—The author gives lists of fossil plants contained in the deposits.—*John H. Schaffner.*

1339. JENNINGS, O. E. Fossil plants from the beds of volcanic ash near Missoula, western Montana. Mem. Carnegie Mus. 8: 385-450. Pl. 22-33. 1920.—The author describes collections made in 1902 and 1905 by EARL DOUGLAS from near Missoula and near Winston in western Montana. The latter is small and the material represents new species of *Equisetum* and *Aralia* but is believed to be the same age as the larger and better preserved collection from the former locality. This includes 21 species, i.e., *Sequoia* 2, *Thuyopsis*, *Sabina*, *Typha*, *Cyperacites*, *Populus* 2, *Juglans*, *Betula*, *Alnus* 2, *Quercus* 3, *Ficus* ?, *Ilex*, *Celastrus*, and *Vaccinium*. Species of *Sequoia*, *Juglans*, *Betula*, *Alnus*, *Quercus*, *Ficus* ?, *Ilex*, *Oelastrus*, and *Vaccinium* are described as new.—This flora is regarded as of Oligocene age and as existing around a mountain lake. There is an ecological discussion in which the fossil flora is compared with those of recent lakes in the Montana Rockies, and it is concluded that the Oligocene climate in that region was somewhat warmer than now prevails in that region, and that the plant associations represented ranged from wet meadow to moderately xerophytic oak forests on sandy or rocky lake shores.—E. W. Berry.

1340. JOHNSTON, R. M. Notes on the discovery of a new fossil fruit from the Deep-Lead Tin Drifts at Derby, Tasmania. Papers and Proc. Roy. Soc. Tasmania 1918: 9-10. 1919.—This article reports the discovery of a lignified fossil fruit possibly allied to *Plesiocapparis prisca* F. von Mueller. It is described by the author as a new species under the name *Carpolithes (Plesiocapparis) Clarkii*.—J. H. Faull.

1341. POTONIE, R. Mitteilung über mazerierte kohlige Pflanzenfossilien. [Notes on the maceration of carbonized plant fossils.] Zeitschr. Bot. 13: 79-89. 12 fig. 1920.—The author describes and figures vertical sections of the stomata of *Thinnfeldia rhomboidalis* Schenk from the Lias (lower Jurassic) of Germany, calling attention to their xerophytic character; the technique of maceration and staining of the fossils is discussed. A specimen of *Callipteris conferta* (Sternberg) Brongniart is described from the Permian (Rothliegende) of Thuringia which shows that it had been mined by some insect larva.—E. W. Berry.

1342. STOPES, MARIE CARMICHAEL. The missing link in Osmundites. Ann. Botany 35: 55-64. Pl. 2, 1 fig. 1921.—A specimen of *Osmundites* from Queensland, Australia, consisting of a piece of rhizome with surrounding leaf bases, was found to have a solid protosteles in the stem. All the other features are typical of the genus including the meristeles in the leaf bases. KIDSTON and GWYNNE-VAUGHAN had concluded that the vascular system of the Osmundaceae must have been derived from just such a protostele though no form possessing one was known to them. The specimen described is regarded as the missing form. The plant is given the name *Osmundites Kidstoni*. The horizon is probably Cretaceous.—W. P. Thompson.

1343. TORREY, R. E. Telephragmoxylon and the origin of wood parenchyma. Ann. Botany 35: 73-78. Pl. 3, 3 fig. 1921.—A lignite of Araucarian affinities from the Cretaceous of Texas shows at the end of the annual ring numerous tracheids which are divided into segments. This is considered to be the first stage in the evolution of wood parenchyma from tracheids. The specimens are placed in a new genus *Telephragmoxylon*.—W. P. Thompson.

PATHOLOGY

G. H. COONS, Editor

C. W. BENNETT, Assistant Editor

(See also in this issue Entries 775, 776, 806, 1026, 1061, 1077, 1095, 1272, 1273, 1275, 1276, 1277, 1279, 1280, 1282, 1293, 1296, 1299, 1301, 1303, 1304, 1311, 1313, 1316, 1328, 1497, 1536)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1344. DANA, B. F., AND GEORGE L. ZUNDEL. A new corn smut in Washington. Phytopath. 10: 328. 4 fig. 1920.—The writers note occurrence at Pullman, Washington, of a new

corn smut identical with head smut of sorghum (*Sphacelotheca reiliana*). Symptoms are given in detail.—*W. H. Tisdale*.

1345. FIGUEROA, C. A. The mottling disease of cane and the sugar production of Porto Rico. Jour. Dept. Agric. Porto Rico 34: 35–41. 1919 [1920].—"Where the infection is most intense the sugar production has diminished most heavily." Statistics are presented of the cane acreage and amount of sugar manufactured in Porto Rico in the crops of 1917 to 1919. In Cayey, where the disease is most severe the acreage of 1918 and 1919 was nearly double that of 1917 but the production of sugar was reduced 50 per cent. For the whole island, on the basis of the crop of 1917, the reduction is 30 per cent.—*D. Reddick*.

1346. HAMBLIN, C. O. Downy mildew of the vine. Agric. Gaz. New South Wales 32: 49–50. 3 fig. 1921.—Grape downy mildew was first observed in New South Wales in 1918. The disease appears early in the season but may not make much headway. It overwinters by spores and probably also by hyphal filaments. Notes on control are given.—*L. R. Waldron*.

1347. LINDFORS. [Rev. of: HENNING, ERNST. Anteckningar om gulrosten. [Aufzeichnungen über den Gelbrost.] Centralanst. Försöksv. p. Jordbruksområdet Medd. 192. 1919.] Zentralbl. Ges. Landw. 1: Entry 731. 1920.—Henning's continuation of the list of ERIKSSON and HENNING (*Die Getreideroste*) on yellow rust years, contains an incorrect statement. On page 10, 3rd line from the bottom for "salweizen, Boreweizen," read "Landweizen." Footnote 2 should be struck out.—*D. Reddick*.

1348. MACKIE, W. W. Head smut in sorghum and maize. Phytopath. 10: 307. 1920.—Author notes occurrence of head smut (*Sorosporium reilianum*) of sorghum, and smut of corn in California.—*W. H. Tisdale*.

1349. STILLINGER, C. R. Apple black rot (*Sphaeropsis malorum*) in Oregon. Phytopath. 10: 453–458. 1920.—The first report of *Sphaeropsis malorum* from Oregon and probable occurrence in Washington and California. The fungus is of small economic importance in orchard and storage. Morphological and physiological studies show the necessity of study of strains of *Sphaeropsis* and *Diplodia*.—*R. B. Streets*.

1350. THOMAS, C. C. Coix smut. Phytopath. 10: 331–333. 1 fig. 1920.—Coix smut (*Ustilago coicis* Bref.) is reported in this country for the first time on plants of *Coix lachryma jobi* grown from seed sent from the Philippine Islands.—*G. Wineland*.

1351. TUBEUF, C. VON. Einbruch der Kiefernmistel nach Bayern von Süden. [The invasion of Bavaria from the south by the pine mistletoe.] Naturw. Zeitschr. Forst- u. Landw. 18: 230–232. 1920.—In July 1919, an outbreak of mistletoe on pine was discovered on the southeast slope on the right hand bank of the Loisach between Eschenlohe and Oebrau. In June of 1920, another infected area was discovered on the east side (west exposure) of the Loisach valley between Garmisch and Eschenlohe. The Alps have previously offered an effective barrier to the mistletoe, and there is little doubt but that the parasite was carried across by the thrush. Tubeuf suggests that the infected areas be gone over and the mistletoe removed and destroyed while the infection is still small; further spread would greatly increase the work of suppression. The invasion by this mistletoe resembles that of *Loranthus* of oak, which was brought up from Bohemia through the Elbe Valley by thrushes into Saxony, and is at present unwisely protected by law.—*J. Roeser*.

1352. WEIMER, J. L. The distribution of buckeye rot of tomatoes. Phytopath. 10: 172. 1920.—This disease, caused by *Phytophthora terrestris*, occurred at Arlington, Virginia, in 1919. The known range northward is thus considerably extended.—*W. G. Stover*.

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

1353. FAWCETT, H. S. *Pythiacystis* and *Phytophthora* (on Citrus). *Phytopath.* 10: 397-399. 1920.—Cultures obtained from fruit and diseased bark of one type of gummosis of citrus in California were mostly *Pythiacystis citrophthora* Sm. and Sm.; cultures made from diseased bark of "footrot" from various sources all gave *Phytophthora terrestria* Sherbakoff. *Pythiacystis*-like forms were obtained from other hosts in California.—R. B. Streets.

1354. HEDGCOCK, GEORGE G., AND N. REX HUNT. Notes on *Peridermium harknessii*. *Phytopath.* 10: 395-397. 1920.—Field observations of the spread of the aecial stage of *Peridermium harknessii*, apparently without the aid of the telial host, are confirmed by experiments with several species of pine in which a true aecial stage follows inoculation with aeciospores.—G. Wineland.

1355. JAGGER, IVAN C. *Sclerotinia minor*, n. sp., the cause of a decay of lettuce, celery, and other crops. *Jour. Agric. Res.* 20: 331-333. *Pl.* 59, 1 fig. 1920 [1921].—A technical description of *S. minor* with illustrations of apothecia, ascospores, and microconidia. Apothecia and sclerotia of *S. libertiana* are much larger. The fungus causes a decay of lettuce and other plants similar to that produced by *S. libertiana*. It is known to occur in Massachusetts, New York, Pennsylvania, and Florida.—D. Reddick.

1356. MATZ, J. Infection and nature of the yellow stripe disease of cane (mosaic, mottling, etc.). *Jour. Dept. Agric. Porto Rico* 34: 65-82. 1919 [1920].—Cuttings from cane showing mosaic were used for propagating purposes. New shoots from such pieces invariably showed symptoms of the disease. The canker stage of mosaic has been secured in as short a time as 3 months.—Transmission experiments by contact failed. Hypodermic injections of juice from diseased plants gave infection in 4 cases of over 200 trials.—Histological studies of diseased and healthy plants were made. "It seems that a foreign plasmodium-like substance is apparently present in the cells of the yellow-striped cane leaf and the stem tissue." This plasmic substance is more constantly present and in a more defined form in cankered cane stalks. It is associated with reddish streaks that may be seen on the interior of severely affected cane. The plasma mass becomes granular in cut pieces and "after eight days motility was observed in the plasma mass." The substance resembles a plasmodium.—D. Reddick.

1357. PELTIER, GEORGE L. The influence of temperature and humidity on the growth of *Pseudomonas citri*, and of its host plants, and on infection and development of the disease. *Jour. Agric. Res.* 20: 295-323. *Pl.* 47-56. 1920 [1921].—The temperature relations of *P. citri*, in culture, are similar to other pathogenes of the *Pseudomonas* group. The factor of time should receive more consideration. When it is considered, the critical temperature in degrees Centigrade are as follows: Minimum, 5; optimum, between 20 and 30; maximum, about 35; thermal death point, between 49 and 52.—Humidity has little or no influence on the viability of the organisms at low temperatures but at high temperatures it is the limiting factor. With medium humidities "at all temperatures, the organism is viable for the period of the experiment." "Some factor or factors, other than the rapidity of drying, are responsible for these results."—Citrus plants under controlled conditions vary markedly in their reaction to temperature and humidity, especially at low and at high temperatures. The optimum temperature for the plants used lies between 20 and 30°C. This condition, with slight variations, also prevails in the field.—Infection depends on 3 conditions: Free moisture on the host, suitable temperature, host in actively growing condition. The organism is active in the tissue so long as the host cells are active. When the host is forced into dormancy the organism becomes inactive. The "period of initial infection" is defined as the time required by the pathogene after it reaches the host to enter the stomates or tissues about a wound. This may occur on plants which are not growing actively. The "period of incubation" extends from the time of initial infection until there is visible evidence of disease. This period therefore depends on the conditions of the host at the time of, and immediately following, initial infection. Frequency of rainfall and the temperature each in a dual relation determine

the number of infections, the length of incubation, and the severity of the disease.—Environmental conditions play an exceedingly important rôle in the susceptibility and resistance of citrus plants to canker and “the results indicate that it will be necessary to study the behavior of the host plant to its environment and its relation to the causal organism before any scientific selection or breeding for disease resistance can be made.”—Pertinent literature is reviewed and a bibliography of 17 titles is appended.—*D. Reddick.*

1358. RANDS, FREDERICK V., AND LILLIAN C. CASH. Some insect relations of *Bacillus tracheiphilus* Erw. Sm. *Phytopath.* 10: 133–140. 1920.—A few striped cucumber beetles were found carrying the wilt organism internally during the winter. Infection may occur from the mouth parts of wilt-fed beetles for a time after feeding and also when the feces of the same beetles come in contact with fresh leaf injuries involving the vascular system. The organism has been isolated from the viscera of wilt-fed beetles.—*S. P. Doolittle.*

1359. RANDS, FREDERICK V., AND W. DWIGHT PIERCE. A coordination of our knowledge of insect transmission in plant and animal diseases. *Phytopath.* 10: 189–231. 1920.—The writers present a review of the literature dealing with insect transmission of plant and animal diseases, with particular reference to diseases of plants. A distinct correlation is found in the principles which apply to insect transmission in both branches of pathology. Insects may act in 3 general relations to diseases caused by micro-organisms: (1) External transmission in which the infective principle is carried on the external body parts of the insect; (2) insects without carrying infection themselves may cause wounds through which parasite organisms gain entrance; (3) internal transmission in which the organism is taken up and passed unharmed through the body of the insect. The transmission of various fungous, bacterial, and “virus” diseases is reviewed in these relations.—*S. P. Doolittle.*

1360. SAUVAGEAU, C. Sur le parasitisme d'une algue rouge. (*Polysiphonia fastigiata* Grev.) [Concerning the parasitism of a red alga.] *Compt. Rend. Acad. Sci. Paris* 169: 1383–1386. 1919.—Certain marine algae support a varied and abundant flora while others do not. The plants attached to them may be classified as epiphytes or parasites. Most of the endophytic algae are restricted to one host plant or to a relatively small number of host plants. *Polysiphonia fastigiata* is found in dense tufts attached to *Ascophyllum nodosum*, and although it has been described as being merely an epiphyte, the author finds that its structure and development indicate that it is a true parasite. It is rarely found attached to *Fucus platycarpus* and *F. vesiculosus*.—*V. H. Young.*

1361. SMYTH, E. GRAYWOOD. Insects and mottling disease. *Jour. Dept. Agric. Porto Rico* 34: 83–116. 1919 [1920].—The insects which might be associated with the transmission and spread of sugar cane mosaic are described. A “summary of our knowledge of insect-borne diseases of plants occurring in America” is presented in tabular form and includes 18 diseases. Experimental methods are described and experiments with the different species are presented in detail. Infection has been secured on 6 plants. The agents concerned are West Indian cane fly (*Stenocranus saccharivorus*), leaf scale (*Pulvinaria iceryi*), yellow cane aphid (*Sipha flava*), and mealy bugs (*Pseudococcus calceolariae* and *P. sacchari*). A bibliography of insect-borne diseases of plants comprising 53 titles is appended.—*D. Reddick.*

1362. SMYTH, E. GRAYWOOD. An annotated bibliography of Porto Rican cane insects. *Jour. Dept. Agric. Porto Rico* 34: 117–134. 1919 [1920].—Brief abstracts of literature, prepared in connection with work on insect transmission of sugar cane mosaic, are presented. [See also preceding entry.]—*D. Reddick.*

1363. SMYTH, E. GRAYWOOD. List of the insects and mite pests of sugar cane in Porto Rico. *Jour. Dept. Agric. Porto Rico* 34: 135–150. 1919 [1920].—The paper, prepared in connection with a study of insect transmission of sugar cane mosaic, gives for each organism the name, distribution, food plants, injury done, enemies and method of control. [See also the 2 preceding entries.]—*D. Reddick.*

1364. SNELL, W. H. Observations on the distance of spread of aeciospores and urediniospores of *Cronartium ribicola*. *Phytopath.* 10: 358-364. 1920.—The writer records field observations in Wisconsin and New York on natural infections of pine and *Ribes*. He concludes that aeciospores can be blown more than $1\frac{1}{4}$ miles to infect *Ribes*. Dry weather in New York prevented a wide distribution of the disease by urediniospores.—*C. J. Humphrey*.

1365. TUBEUF, C. VON. [Rev. of: CLINTON, G. P., AND FLORENCE A. McCORMICK. *Infection experiments of Pinus strobus with Cronartium ribicola*. Connecticut (New Haven) Agric. Exp. Sta. Bull. 214. 428-459, pl. 37-43. 1916-1918 (see Bot. Absts. 6, Entry 225).] *Naturw. Zeitschr. Forst- u. Landw.* 18: 236-237. 1920.—The reviewer calls attention to his previous contributions on the same subject. He briefly reviews and criticizes the authors' conclusions on the methods of attack of the fungus, and its external manifestations on the foliage.—*J. Roeser*.

1366. WALKER, J. C., AND W. B. TISDALE. Observations on the seed transmission of the cabbage black rot organism. *Phytopath.* 10: 174-177. 1920.—A large percentage of cabbage plants grown from imported seed developed black rot (*Bacterium campestris*). When seed of the same lot was treated with mercuric chloride, the disease was practically eliminated.—*S. P. Doolittle*.

THE HOST (RESISTANCE, SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1367. ARTSCHWAGER, ERNST F. Pathological anatomy of potato blackleg. *Jour. Agric. Res.* 20: 325-330. Pl. 57-58. 1920 [1921].—Material for study was taken in arid part of Colorado, U. S. A. Plants affected with black leg show an increase in strongly lignified vascular tissue and a transformation of most of the parenchyma cells of cortex and pith into sclereids. Protein crystals occur in the cells of leaves of affected plants; in healthy plants they have been observed only in peripheral cells of the cortex in tubers.—*D. Reddick*.

1368. COLLINS, J. FRANKLIN. Notes on the resistance of chestnut to blight. *Phytopath.* 10: 368-371. 2 fig. 1920.—Results of observations indicate that the American chestnut (*Castanea dentata*) is developing resistance to blight. The author describes a case in which a young chestnut shoot apparently recovered from the disease.—*Ruth G. Bitterman*.

1369. COLON, E. D. The absorption spectrum of the chlorophyll in yellow-striped sugar-cane. *Jour. Dept. Agric. Porto Rico* 34: 43-46. 1919 [1920].—Leaves from healthy plants and from plants affected with mosaic were used. The absorption spectra from alcoholic solutions of chlorophyll from the two kinds of leaves were alike. "Although the tests above described were not as numerous nor performed with as many solvents as might have been desirable, they warrant the belief that the disappearance of the pigment in yellow-stripe is not primarily due to a decomposition of chlorophyll as such."—*D. Reddick*.

1370. EARLE, F. S. The years experience with sugar-cane mosaic or stripe disease. *Jour. Dept. Agric. Porto Rico* 34: 3-33. 1919 [1920].—An account is given of the lines of activity in Porto Rico since October, 1918, in the study of mosaic. An historical résumé of previous work, with comments upon the researches presented in the same journal by others, is presented. In some cases the comments are more specific or more detailed than those presented by the authors. [See Bot. Absts. 8, Entries 1345, 1356, 1361, 1369, 1378].—*D. Reddick*.

1371. EDSON, H. A. Vascular discoloration of Irish potato tubers. *Jour. Agric. Res.* 20: 277-294. 1920 [1921].—Vascular discoloration of stem-end tissues of Irish potato tubers is not proof of the presence of parasitic fungi. Discolored bundles often are sterile and fungi frequently are isolated from tissues which appear normal.—Out of 3,203 attempts, by plating, to isolate fungi from tubers, all but 161 of which were discolored, 1,352 gave no growth.

In those yielding growth, many organisms were found: Species of *Fusarium*, 720 times; *Alternaria*, 615 times; bacteria, 241 times; *Verticillium*, 147 times; *Penicillium*, 104 times; *Colletotrichum*, 91 times; *Rhizoctonia*, 12 times; miscellaneous, 87 times.—Field trials in Colorado with tubers from widely separated sources indicate that neither vascular discoloration nor fungous invasion of the tissues of the mother tuber is a guaranty of disease in the resulting plants; nor is their absence a guaranty of health. The soil and not the tuber is the more potent source of disease.—Stem-end pieces used for planting yielded slightly higher percentages of diseased plants than did eye-end pieces. Plants showed a marked capacity for recuperation, which varied with the variety, environment, and with the interaction of the two.—*D. Reddick*.

1372. FRACKER, S. B. Varietal susceptibility to false blossom in cranberries. *Phytopath.* 10: 173-175. 1920.—A tabular presentation and brief discussion of varietal susceptibility. The cultural conditions are given, together with inspection practices and control measures.—*R. B. Streets*.

1373. GUYTON, T. L. The chrysanthemum gall midge. *Ohio Agric. Exp. Sta. Bull.* 341. 103-114, 6 fig. 1920.

1374. HAHN, GLENN G., CARL HARTLEY, AND ARTHUR S. RHODES. Hypertrophied lenticels in the roots of conifers and their relation to moisture and aeration. *Jour. Agric. Res.* 20: 253-265. *Pl.* 44-46. 1920 [1921].—Unusual excrescences on the roots of 10 species of *Pinus*, 4 of *Picea*, and of *Abies balsamea*, *Tsuga canadensis*, *Larix laricina*, *Taxus cuspidata*, *T. brevifolia*, and *Araucaria bidwellii*, are found to have the structure of lenticels, much enlarged. They occur and were produced in various kinds of soil in the presence of excessive soil moisture. Hypertrophy occurs on both weak and vigorous plants. It is decreased by top pruning and is increased by root injury.—The literature is reviewed. The belief that excessive soil moisture stimulates lenticel hypertrophy mainly by increasing general sap pressure, and that oxygen hunger is of no importance as a stimulus, is not supported by these experiments. A bibliography of 23 titles is appended.—*D. Reddick*.

1375. HURD, ANNIE MAY. Injury to seed wheat resulting from drying after disinfection with formaldehyde. *Jour. Agric. Res.* 20: 209-244. *Pl.* 36-41. 1920 [1921].—Results of investigations on the post-treatment action of formaldehyde on wheat are recorded. The major conclusion reached is that injury results from the drying of grain treated with formaldehyde solution; that seed wheat is uninjured by a 0.1 per cent solution (1-40) and, if kept moist, may be held indefinitely without injury unless attacked by molds. Neither a 0.1 per cent (1-40) nor a 0.2 per cent (1-20) solution of formaldehyde produces injury if the wheat is germinated immediately. Injury to dried grain is cumulative. Paraformaldehyde is deposited on dried grain, and the gas formed by the volatilization of this solid penetrates the wheat slowly, probably going into solution in the pericarp. The manner of drying and the moisture content of the atmosphere surrounding the grain determine the nature and extent of injury. An atmospheric humidity of over 70 per cent during the storage period prevents injury; one of 70 per cent or less permits injury, which is most severe in the intermediate humidities, gradually decreasing in the lower ones. Treated grain stored in an absolutely dry chamber is almost uninjured. It is considered probable that the formaldehyde does not enter the wheat as a gas or in the solid polymeric form, but in solution in the seed coats. An optimum atmospheric humidity to permit, first, the formation of paraformaldehyde, and, second, the solution of formaldehyde gas in the grain, results in maximum injury from drying after treatment. Injury is minimized by spreading the wheat as it dries so that maximum aeration occurs. Washing the grain with water immediately after treatment entirely prevents post-treatment injury from dry storage.—*L. M. Massey*.

1376. KELLEY, W. P., AND A. B. CUMMINGS. Composition of normal and mottled citrus leaves. *Jour. Agric. Res.* 20: 161-191. 1920 [1921].—Lemon, orange, and grapefruit leaves are similar in composition. As growth of normal orange leaves proceeds the percentages of

potassium and phosphorus, when expressed on the basis of either the ash or the dry matter, and of nitrogen in the dry matter, decrease; the percentages of calcium, however, increase. The concentration of iron is greater in very young leaves, later decreasing slowly. The concentration of the different constituents probably remains practically constant throughout the period of normal maturity. Notable amounts of potassium and nitrogen are translocated back into some portion of the tree as the leaves approach senility just preceding the time of normal dropping. A part of the phosphorus also appears to be removed from the leaf some time preceding normal maturity. The absolute content of magnesium does not decrease as maturity approaches. Maximum amounts of potassium, phosphorus, and nitrogen are contained in orange leaves by the time they are about 6 weeks of age. The absolute content of calcium continues to increase until full maturity is reached. The highly calcareous nature of the orange leaf is its most pronounced characteristic, the dry matter of the mature leaf containing 5-6 per cent of calcium.—The composition of mottled citrus leaves differs from that of normal leaves mainly in that the calcium content is smaller and the potassium, phosphorus, and usually the nitrogen contents are greater. The composition of mottled orange leaves resembles that of immature leaves, although the percentages of ash and nitrogen in the former are materially greater than in the latter. The sap of normal orange leaves becomes increasingly concentrated and acidic, and when mature is especially rich in calcium. The sap of mottled leaves contains sub-normal amounts of calcium and concentrations of potassium and phosphorus fully twice as high as in mature normal leaves. Abnormally large amounts of unionized acids occur in mottle-leaf sap. The composition of leaf spurs of severely mottled trees varies from the normal in much the same way as the leaves; that of the older wood is more nearly normal. The roots appear to contain considerably less than normal amounts of potassium and phosphorus but an approximately normal amount of calcium. The abnormalities in the composition of different parts of mottled citrus trees may be due, in part at least, to the inability of the tree to satisfy its normal calcium requirements at critical periods. The possibility of correlating abnormalities in the composition of mottled trees with conditions conducive to the disease is suggested. The significance of subnormal concentrations of calcium accompanied by supernormal concentrations of potassium and phosphorus in the leaves, especially in relation to the limiting of chlorophyll production, is not known. No causal relationship may exist. If an inadequate supply of calcium conditions the deficiency of chlorophyll, it probably does so indirectly. Mottle-leaf must be produced experimentally before any explanation can be safely accepted. The leaves of affected trees are not suffering from inadequate supplies of potassium, phosphorus, nitrogen, or iron.—*L. M. Massey.*

1377. LEVINE, MICHAEL. Studies on plant cancers—II—The behavior of crown gall on the rubber plant (*Ficus elastica*). *Mycologia* 13: 1-11. *Pl. 1-2.* 1921.—“*Bacterium tumefaciens* inoculated into the apical internode of the branches, into the leaves, or main stem of the rubber tree stimulates the development of a neoplasm in the region of inoculation. The early stages in the development of the crown gall in *Ficus elastica* does not interfere with the life of the plant as a whole nor does it interfere with the growth of the inoculated branches. The crown gall in *Ficus elastica* after a number of months of active growth becomes hard and dry and finally dies. The invasion of the stem by the new growth does not destroy the entire conducting system of the stem, yet that portion of the stem above the gall dies, as well as a considerable portion of the stem below. Cultures made from pieces of the crown gall and stem above the gall yield only a schizomycete which in appearance is not unlike *B. tumefaciens* and which when inoculated into the stem of young geranium and rubber plants produces crown galls in the region of inoculation. It is possible that the crown gall cells or the crown gall forming organisms are responsible for the progressive necrosis of the stem from the gall upward and downward. The death of the plant due to crown gall is at least suggestive of the death caused by malignant growth in animals.”—*H. R. Rosen.*

1378. LÓPEZ DOMÍNGUEZ, F. A. Has “yellow-stripe” or “mottling” disease any effect on the sugar content of cane juice? *Jour. Dept. Agric. Porto Rico* 34: 47-64. 1919 [1920].—From a series of analyses of healthy cane and cane affected with the mosaic disease it is con-

cluded that there is no material reduction in the sugar content of juice from affected plants. When stalks are so severely affected that they are cracked open, fermentation sets in and sucrose is lost.—The juice of diseased cane shows a higher acidity; this is not sufficient to cause inversion except in very acute stages of the disease.—*D. Reddick*.

1379. MELCHERS, LEO E., AND JOHN N. PARKER. Three winter wheat varieties resistant to leaf rust in Kansas. *Phytopath.* 10: 164–171. 2 fig. 1920.—Experiments carried on for 6 years show 3 hard winter wheats, “P762 Kanred,” “P1066,” and “P1068” to be markedly resistant to leaf rust, *Puccinia triticea*. These varieties grown in commercial fields over Kansas retain their resistant qualities.—*H. H. McKinney*.

1380. TOWNSEND, C. O. An immune variety of sugar cane. *Sugar* 21: 305. 1919.—The Kavangire cane and its immunity to the mosaic disease are described.—*C. W. Edgerton*.

1381. TOWNSEND, C. O. Una variedad immune de la caña de azucar. [An immune variety of sugar cane.] *Sugar* 21: 392. 1919.—A translation in Spanish of an earlier article [see the preceding entry].—*C. W. Edgerton*.

1382. TUBEUF, C. VON. Die Wirtspflanzen von *Peridermium strobil*. [Host plants of *Peridermium strobil*.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 214–215. 1920.—A list of the hosts on which *Peridermium strobil* has been discovered is given: *Pinus Strobus*, *P. Lambertiana*, *P. monticola*, *P. flexilis*, *P. aristata*, *P. cembra sibirica*, *P. cembra alpina*, and *P. peuce*. No case has been observed of an attack on *Pinus excelsa*.—*J. Roeser*.

DESCRIPTIVE PLANT PATHOLOGY

1383. B[ARBER], C. H. The mosaic or mottling disease of sugar cane. *Internat. Sugar Jour.* 23: 12–19. 1 pl. 1921.—A summary of the work on sugar cane mosaic by J. R. JOHNSTON, R. M. GREY, C. W. EDGERTON, F. S. EARLE, G. L. FAWCETT, J. A. STEVENSON, and E. W. BRANDES.—*E. Koch Tisdale*.

1384. CARPENTER, C. W. Hawaii Agricultural Station reports on cane root rot fungus. *Sugar* 22: 20–22. 1920.—The deterioration of Lahaina cane, and its relation to a fungus of the *Pythium* type, are discussed.—*C. W. Edgerton*.

1385. COLON, E. D. La enfermedad de las rayas amarillas. [The yellow stripe disease.] *Sugar* 21: 52. 1919.—A short discussion of the yellow stripe or mosaic disease of sugar cane.—*C. W. Edgerton*.

1386. CUTTING, E. M. [Rev. of: HILEY, W. E. The fungal diseases of the common larch* *xi + 204 p., 73 pl. and diagrams.* Clarendon Press: Oxford, 1919 (see Bot. Absts. 7, Entry 1188).] *Sci. Prog.* [London] 15: 146–147. 1920.

1387. EARLE, F. S. La enfermedad del mosaico en Puerto Rico. [The mosaic disease in Porto Rico.] *Sugar* 21: 551. 1919.—A brief discussion of the mosaic disease of sugar cane in Porto Rico is presented.—*C. W. Edgerton*.

1388. EDGERTON, C. W., AND C. C. MORELAND. Tomato wilt. *Louisiana Agric. Exp. Sta. Bull.* 174. 54 p., 19 fig. 1920.—Results are presented of 10 years investigations on the tomato wilt, including laboratory, greenhouse, and field work. The disease shows on all parts of the host plant and during all stages of its development. It is, however, most frequently observed about the time the fruits are developing. The fungus, *Fusarium lycopersici*, enters the plants from the soil. The spores of the fungus will remain alive on tomato seed from fall to spring. The disease develops best on light, fertile soil; it is very rarely found in the alluvial sections of the state. Some substances added to the soil retard the development of the disease. Ten tons of lime to the acre delays the wilt for about 2 weeks or more. The disease develops best when the temperature is comparatively high, the optimum tem-

perature for growth of the fungus being around 29°C. When the temperature remains much below this, the disease does not develop strongly. This is shown by weekly tests made throughout the year. During the winter months, the infection percentage was very low.—Attempts to obtain wilt-resistant strains have given good results. No variety is immune, but the wilt develops much more slowly in some than in others; this slower development enables the more resistant strains to make a satisfactory crop of fruit. Many of the commercial varieties, including the widely grown Stone variety, are extremely susceptible to the disease. Results of variety tests are given. The recommendations for control include rotation, seed bed sanitation, and the use of resistant and early varieties.—*C. W. Edgerton.*

1389. ELLIOTT, JOHN A. **Arkansas cotton diseases.** *Arkansas Agric. Exp. Sta. Bull.* 173. 26 p., 5 pl. 1921.—This is a popular account of Arkansas cotton diseases, with notes on occurrence. "Phoma blight" is described as a new disease.—*John A. Elliott.*

1390. GESCHWIND, ANDREAS. **Das Vorkommen des Hallimasch (*Agaricus melleus* Quèl.) in den Bosnisch-herzegowinischen Wäldern.** [The occurrence of a honey mushroom in the forests of Bosnia-Herzegowina.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 182-186. 1920.—*Armillaria mellea* is as common in the more or less natural forests of this province as it is in those of central Europe, but it is less destructive than in the cultural forests of the latter. Under natural conditions, beech and aspen, when in mixture with softwoods, protect the latter by acting as hosts for the disease. Wherever the beech is removed from the forest to make room for softwood reproduction, the result is that the desired reproduction does not come and the softwood falls prey to the fungus. The common practice of opening the forest, when a part of a meadow unit, to induce the growth of grasses, furnishes ideal conditions for the entrance of bark-beetles and the honey mushroom. In the extensive forests of the plains ("Karstwälder"), the physical conditions of the soil furnish less ideal conditions for the spread of the rhizomorphs through the soil than do the other forests.—*J. Roesser.*

1391. GODFREY, G. H. **A seed-borne *Sclerotium* and its relation to a rice-seedling disease.** *Phytopath.* 10: 342. 1920.—The author notes the occurrence of a seed-borne *Sclerotium* of rice in Louisiana and its relation to a seedling blight. The possibility of hot water seed-treatment is suggested.—*W. H. Tisdale.*

1392. HAHN, G. G. ***Phomopsis juniperovora*, a new species causing blight of nursery cedars.** *Phytopath.* 10: 249-253. 1 pl. 1920.—Study of a fungus causing a widespread nursery blight of *Juniperus virginiana* from New York to Kansas indicates that a new species is involved. The fungus is similar to *Phomopsis thujae*, a European form. Greenhouse inoculations on *Thuja* gave positive results, but negative ones were obtained on *Abies*, *Picea*, and *Pinus*.—*P. V. Siggers.*

1393. HAMBLIN, CHAS. O. **Flag smut and its control.** *Agric. Gaz. New South Wales* 32: 23. 1921.—Notes are given on the disease and hints as to its control.—*L. R. Waldron.*

1394. HARTER, L. L., AND J. L. WEIMER. **Sweet potato stem rot and tomato wilt.** *Phytopath.* 10: 306-307. 1920.—The authors report negative results from inoculating sweet potatoes and tomatoes, using respectively *Fusarium lycopersici* from tomatoes and *Fusarium hyperoxysporum* from sweet potato.—*William B. Tisdale.*

1395. HARTLEY, CARL, AND GLENN G. HAHN. **Notes on some diseases of aspen.** *Phytopath.* 10: 140-147. 3 fig. 1920.—The authors describe certain diseases found on the aspen in the Pike's Peak region of Colorado. Much damage to leaves is often caused by *Sclerotinia bifrons*, very little damage by *Melampsora albertensis* but a premature defoliation by *M. medusae*, and a blighting of leaves and lateral twigs by *Marsonia populi*. Twig troubles and cankers on trunk and stem are described but no causal organism has been found. *Fomes igniarius* causes rot and premature death of the aspen.—*E. M. Gilbert.*

1396. HOWARD, W. L., AND W. T. HORNE. Brown rot of apricots. Univ. California Agric. Exp. Sta. Bull. 326. 73-88. 1920.—The results for one season, using 16 different spray treatments, justify the conclusion that apricot blossoms may be effectively protected from brown rot by spraying the trees once, shortly before they come into bloom, with either lime-sulphur or Bordeaux mixture. The lime-sulphur should be used at the rate of 1 gallon to 9 gallons of water, and the Bordeaux mixture at a strength of 4-5-50 (4 lbs. bluestone, 5 lbs. fresh stone lime, 50 gal. water). The so-called dry lime-sulphur, used at the rate of 12 lbs. to 50 gal. of water, is quite as effective as either of the other 2 sprays. Early winter spraying against the brown rot is useless. Brown rot on the fruit cannot be prevented by cutting out the diseased twigs, but twig blight can be controlled as effectively, and more easily, by removing them in the fall or winter as by cutting them out in the spring.—A. R. C. Haas.

1397. HUBERT, E. E. Observations on *Cytospora chrysosperma* in the Northwest. Phytopath. 10: 442-447. 1920.—The unusually dry summers of 1917, 1918, and 1919 favored the development of *Cytospora chrysosperma* on shade and ornamental trees. It is common and injurious in Montana, Idaho, Wyoming, and Washington on species of *Populus*, *Acer* and *Salix*, *Prunus demissa*, *Sorbus scopulina*, and *Sambucus glauca*. The author produced infection on small plants of *Populus trichocarpa* low in vigor. Control methods consist in selecting resistant species, giving proper care to shade trees, and closely inspecting nursery stock.—C. J. Humphrey.

1398. JOHNSON, JAMES. Fusarium-wilt of tobacco. Jour. Agric. Res. 20: 515-535. Pl. 63-67. 1921.—This previously undescribed disease was found to occur in Maryland, Ohio, and Kentucky. It is characterized by a yellowing and wilting of the leaves, usually followed by death of the entire plant. The vascular system of infected plants is characteristically brown or black. The pathogene concerned is *Fusarium oxysporum* (Schlecht.) Wr. var. *nicotianae* n. var., of which a description is given. The fungus differs somewhat from *F. oxysporum* (Schlecht.) Wr. in morphology, physiology, and pathogenicity. Infection was secured with 2 strains of *F. oxysporum* from potato on tobacco, but not with the tobacco strain on potato. The symptoms of the wilt produced by the potato strain were not identical with those produced by the strain from tobacco. Conditions favoring infection with the tobacco-wilt organism are heavy soil infestation, wounded host tissue, a relatively high soil temperature (28-31°C.), and a susceptible variety. Varieties of tobacco differ markedly in their resistance to the disease. The White-Burley variety is most susceptible, and the Havana Seed and Cuban varieties are among the most resistant. The development of resistant strains within the various susceptible varieties offers the most helpful means of control. Growers are advised not to grow tobacco on infested soils and to avoid the danger of infested seed beds.—L. M. Massey.

1399. MATZ, JULIUS. Gumming disease of sugar cane in Porto Rico. Phytopath. 10: 429-430. 1 fig. 1920.—The author gives the distribution of the gumming disease caused by *Bacterium vascularum*. The variety "Otaheite" is very susceptible to the disease. "Cavengerie," a less popular variety, is apparently very resistant.—William B. Tisdale.

1400. MATZ, JULIUS. Gumming of sugar cane in Porto Rico. Sugar 22: 282-283. 1920.—A description and history of the gumming disease of sugar cane caused by *Bacterium vascularum*.—C. W. Edgerton.

1401. MATZ, JULIUS. La gomosis de la caña de azucar. [Gumming of sugar cane.] Sugar 22: 363-364. 1 fig. 1920.—A translation in Spanish of an earlier publication [see preceding entry].—C. W. Edgerton.

1402. MERKER, GUSTAV. Ein neuer Pilzschädling im Fichtenpflanzgarten. [A new fungus pest in Norway spruce (*Picea excelsa*) nurseries.] Naturw. Zeitschr. Forst- u. Landw. 18: 218-219. 1920.—This new disease was discovered on 4-year spruce in the spring of 1920 in the "Forstverwaltung" Grätz, near Troppau in Silesia, and the causal organism was identi-

fied as *Rhizoctonia violacea*. It is commonly known to attack the roots of various garden plants, such as clover, lucern, beets, etc., and has been known to attack young larch trees. This is the first known attack on spruce. It manifests itself as a dense violet fungus covering on the roots and root collar, which in part peels off as layers, in part adheres firmly. Attacked plants should be immediately removed and the soil strewn over with quicklime and turned under.—*J. Roesser*.

1403. QUANJER, H. M. The mosaic disease of the Solanaceae, its relations to the phloem-necrosis and its effect upon potato culture. *Phytopath.* 10: 35-37. 14 fig. 1920.—Field and greenhouse experiments conducted for a number of years show the mosaic on tobacco, tomato, and potato to be of a similar nature. The mosaic symptoms on the potato become evident the season after infection. Grafting experiments demonstrate the contagious nature of the disease. The experiments indicate that transmission under field conditions is usually through root contact. The author suggests that the disease may be due to a virus but more probably to an ultramicroscopic parasite.—*R. E. Vaughan*.

1404. ROBERTS, JOHN W. The apple-blotch and bitter-rot cankers. *Phytopath.* 10: 353. 1920.—The apple-blotch canker caused by *Phyllosticta solitaria* and the bitter-rot canker caused by *Glomerella cingulata* are discussed from the standpoint of their relation to the host.—*A. J. Riker*.

1405. ROSENBAUM, J. A *Macrosporium* foot-rot of tomato. *Phytopath.* 10: 415-422. 4 fig. 1920.—The fungus, found in Delaware fields and causing a rot at the base of tomato stems, resembles the parasite (*M. solani*) causing the early blight of potato. The pathogenicity of the organism was established. The fungus differs in cultural and morphological characters from the *Macrosporium* causing the nail-head spots on ripe tomato fruit.—*R. E. Vaughan*.

1406. SEDLACZEK. [Rev. of: NEGER, F. W. Die Krankheiten unserer Waldbäume und wichtigsten Gartengeholze. (Diseases of our forest trees and most important ornamentals.) viii + 286 p., 234 fig. Ferdinand Enke: Stuttgart, 1919 (see Bot. Absts. 6, Entry 1280).] Oesterreich. Forts- u. Jagdzeitg. 38: 37-38. 1920.—This book is similar in compass and arrangement to HARTIG's "Diseases of Trees," but brought up to date. It consists of 2 parts—non-parasitic diseases and diseases caused by parasitic plants.—*F. S. Baker*.

1407. SMILEY, EDWINA M. The *Phyllosticta* blight of snapdragon. *Phytopath.* 10: 232-248. 8 fig. 1920.—*Antirrhinum majus* is the only host known to be affected by *Phyllosticta antirrhini*. Symptoms, etiology, and pathological effects of the disease are discussed.—*Ruth G. Bitterman*.

1408. TUBEUF, C. VON. *Rhizoctonia violacea* an Fichten. [*Rhizoctonia violacea* on Norway spruce (*Picea excelsa*).] *Naturw. Zeitschr. Forst- u. Landw.* 18: 233-234. 1920.—Tubeuf refers to an article by MERKER (see Bot. Absts. 8, Entry 1402), and calls attention to the fact that HARTIG reported this fungus as attacking young spruce. Past experiments to produce the perithecium of the fungus were failures, and the experiments, in general, were superficial. Tests by the author of imported, infected plants in 1919 and 1920 planted with healthy stock, resulted in a full recovery of the diseased stock and no attack on the other.—*J. Roesser*.

1409. WOLF, F. A. Bacterial blight of the soybean. *Phytopath.* 10: 119. 5 fig. 1920.—The author describes a disease of soybeans occurring in North Carolina caused by *Bacterium soyae* n. sp. Symptoms of the disease and cultural character of the causal organism differ from those described by F. COERPER. No difference in varietal susceptibility was noted. The organism is believed to be seed borne.—*William B. Tisdale*.

1410. WOLF, F. A. A little known vetch disease. *Jour. Elisha Mitchell Sci. Soc.* 36: 72-85. Pl. 2-6. 1920.—A report on an important disease caused by *Protocoronospora nigri-*

cans and resembling an anthracnose in its effect. Dark, elongated lesions may occur on any part of the plant above ground. The disease is now known to occur in North Carolina, South Carolina, Georgia, Mississippi, Louisiana, Tennessee, and at Ithaca, New York (the type locality). Infection is carried in the seed, which may thus introduce the disease to new fields.—*W. C. Coker*.

ERADICATION AND CONTROL MEASURES

1411. ANONYMOUS. **Porto Rico fights cane mottling disease.** *Sugar* 22: 208-210. 1920.—A review of recent publications from the Porto Rico Experiment Station on the mosaic disease of sugar cane.—*C. W. Edgerton*.

1412. BOTJES, J. OORTWYN. **Raising phloem-necrosis and mosaic free potatoes, and a source of infection whose nature has not yet been elucidated.** *Phytopath.* 10: 48-49. 1920.—Tubers from selected healthy plants should be planted by the hill-row method with 3 or 4 meters between the rows. The intervening spaces should be planted with other crops. When any plant shows disease all of the same progeny should be discarded. Fields and nursery plots should be widely separated.—*R. E. Vaughan*.

1413. BUTLER, O. **On the amount of copper required for the control of *Phytophthora infestans* on potatoes.** *Phytopath.* 10: 298-304. 3 *fig.* 1920.—Spraying experiments with Bordeaux near Durham, New Hampshire, in 1919, showed the amount of copper necessary per acre per annum to control losses from *P. infestans* to be between 24 and 26 lbs. The experiments demonstrated that 1:0.5 Bordeaux was superior to 1:1.—*R. E. Vaughan*.

1414. DETWILER, S. B. **Results of white pine blister-rust control in 1919.** *Phytopath.* 10: 177-180. 1920.—A summary of the blister-rust control work done in the U. S. A., with detailed statement of cost of Ribes eradication.—*Frank T. McFarland*.

1415. EARLE, F. S. **Instrucciones para la eradicacion de la enfermedad del Mosaico de la cana.** [Instructions for the eradication of the mosaic disease of cane.] *Sugar* 21: 51-52. 1919.—A brief discussion of the mosaic disease of sugar cane and its control by means of selection and roguing.—*C. W. Edgerton*.

1416. EDGERTON, C. W. **A new method of selecting L 511 cane free of the mosaic disease for planting purposes.** *Louisiana Planter and Sugar Manufacturer* 65: 252-253. 1920.—Practically a reprint of Louisiana Agric. Exp. Sta. Bull. 176 [see following entry].—*C. W. Edgerton*.

1417. EDGERTON, C. W. **A method of selecting L 511 cane free of the mosaic disease for planting purposes.** *Louisiana Agric. Exp. Sta. Bull.* 176. 7*p.*, 1*fig.* 1920.—The L 511 variety of sugar cane is more resistant to the mosaic disease than the other common varieties. The disease can be detected upon the stalks of this variety by the presence of red stripes. In selecting healthy cane for seed, the stalks can be selected after being cut and stripped, thus eliminating the difficult field inspection. A 1-year test of this method of selection proved entirely satisfactory.—*C. W. Edgerton*.

1418. GILBERT, ALFRED H. **Certified seed inspection in Vermont.** *Potato Mag.* 3: 6, 20-21, 26. 1921.

1419. GOUAUX, C. B. **Mosaic disease of sugar cane in Louisiana.** *Louisiana Planter and Sugar Manufacturer* 65: 269. 1920.—Recommendations for roguing out diseased plants in sections where the disease is as yet very limited.—*C. W. Edgerton*.

1420. HENNING, ERNST, OCH THORE LINDFORS. **Krusbärsmjöldaggens Bekämpande—Studier och Forsök.** [Gooseberry mildew control—investigations and experiments.] *Centralanst. Försöksv. Jordbruksområdet Medd.* 208. 51 *p.* 1920.—The article describes briefly

the first appearance of mildew in Ireland and its subsequent spread into Sweden and other European countries. Digging and burning were the first methods of control advocated. Henning in 1907 reported good results from pruning and spraying. Results with other control methods are discussed. The production of good resistant varieties by means of crosses between European and American varieties is considered possible. The results of spraying experiments with 17 different spray materials are given. The mildew is said to be most severe on bushes grown in moist locations or fertilized with nitrogenous materials. A brief discussion of the quarantine laws in several European countries is given. Control methods advocated include the cutting out and burning of diseased portions in the fall, together with liming and cultivating the bushes. The eradication of nearby wild bushes is advised. In the spring, the tops of plants to be set out should be dipped in 1-40 formalin solution, and plants should be sprayed with a formalin solution. If buds have not started, a 1-40 or 1-60 solution is recommended; but if plants have begun to bud, a 1-100 solution should be used.—*Mr. and Mrs. W. W. Gilbert.*

1421. HOLBERT, J. R., J. F. FROST, AND G. N. HOFFER. Wheat scabs as affected by systems of rotation. *Phytopath.* 9: 45-47. 1919.—A report of a survey of 1500 acres of wheat in 28 fields in central Illinois. Wheat following corn showed considerably more scab (*Gibberella saubinetii* (?) than when following wheat, oats, or clover in the rotation. In 1 field, wheat following 2 years of corn yielded 25 bushels with 20 per cent scab; wheat following 1 year of corn yielded 33 bushels with 2 per cent scab. The most severe scab infestations were found in low places where trash from the preceding crop had collected.—*C. W. Bennett.*

1422. MURPHY, PAUL A., AND E. J. WORTHY. Relation of climate to the development and control of leaf roll of potato. *Phytopath.* 10: 407-414. 1 fig. 1920.—Hill selections of leaf-roll plants from Prince Edward Island in 1916 were planted in 1917 in tuber units at Charlottetown, Prince Edward Island; Bermuda; and Ottawa, Canada. Plants from the same hills reacted similarly at each station. The next year the Bermuda seed at Charlestown showed 97.5 per cent leaf-roll compared with 60.7 per cent in local stock. Authors suggest wholesale introduction of potato seed from disease-free districts as a practical means of control.—*R. E. Vaughan.*

1423. PEYRONEL, B. Sevrnamento di *Marsonia juglandis* sui rami e polloni del noce. [The overwintering of *Marsonia juglandis* on the branches and shoots of the walnut. *Staz. Sperim. Agrarie Ital.* 53: 168-171. 1920.—The author found in the winter months, on the young branches and twigs of *Juglans*, the conidial form of *Marsonia juglandis*, and suggests a close examination of the branches of infected plants, since these are exceedingly good sources of infection in early spring.—*A. Bonazzi.*

1424. STEVENSON, JOHN A. Control of sugar cane mottling disease. *Sugar* 22: 539-541. Fig. 1. 1920.—An article reprinted from *Jour. Dept. Agric. Porto Rico*. Methods being used in Porto Rico to control the mosaic disease of sugar cane are discussed.—*C. W. Edgerton.*

1425. TICE, C. Seed-potato inspection. *Agric. Jour.* [British Columbia] 5: 276. 1920.

1426. TICE, C. Potato certification in B. C. *British Columbia Dept. Agric. Circ. Bull.* 32. 6 p. 1921.

1427. WALKER, J. C. Experiments upon formaldehyde-drip control of onion smut. *Phytopath.* 10: 323-327. 1920.—Experiments conducted near Racine, Wisconsin, from 1913 to 1918 show that the application of approximately 200 gallons of 1:128 formaldehyde solution per acre gives satisfactory control of onion smut. When the quantity of solution is reduced to 120-150 gallons the writer advises increasing the concentration to 1:64.—*R. E. Vaughan.*

MISCELLANEOUS (COGNATE RESEARCHES; TECHNIQUE, ETC.)

1428. FISHER, D. F., AND C. BROOKS. **Drouth-spot and related physiological diseases.** Agric. Jour. [British Columbia] 5: 290-293. 6 fig. 1920.—A paper read at the International Fruit Growers' Convention, Vernon, B. C., August 1920. With typical drouth-spot Winesap and Stayman were observed to be most seriously affected, followed by Gano and Ben Davis. Delicious, White Pearmain, and Jonathan do not react in the same way. Although the fruit may become badly shriveled no drouth-spot appears, and with the resumption of irrigation the apples regain normal turgor and mature with merely a certain deficiency in size and "quality." Typical drouth-spot and oozing developed on susceptible varieties before shriveling and the resumption of irrigation. It must, therefore, be due to withdrawal of water and not to sudden resumption of growth on addition of water. "Cork" is always associated with very open or very shallow soils or those markedly deficient in humus. "Apple blister" is probably due to drouth during or immediately following the blossoming period, the remedy being earlier irrigation. "Punk" is a condition somewhat resembling "physiological break-down" in storage and possibly due to intermittent drouth combined with intense sunlight. A drouth-spot accompanied by copious gumming, and resulting in hard bitter spots in the ripe fruit, also occurs in plums and prunes.—*J. W. Eastham.*

1429. HARTLEY, CARL. **Abnormal growth induced by chloral hydrate soil treatment.** Phytopath. 10: 334-335. 1 fig. 1920.—Chloral hydrate (0.076 and 0.172 kgm. per sq. m.) applied to the soil before sowing to *Pinus ponderosa* seed produced seedlings with the first needles partially fastened together, as well as showing other abnormalities.—*James Johnson.*

1430. LEVIN, ISAAC, AND MICHAEL LEVINE. **The biological and clinical evidence of the therapeutic value of radium and Röntgen rays in cancer.** Ann. Surgery 52: 443-447. Apr., 1918.—In a preliminary study of the effect of Röntgen rays on normal *Ricinus* plants it was found that no injury resulted. *Ricinus* plants inoculated with *Bacterium tumefaciens* and given 6 treatments with Röntgen rays at intervals of 2 days for a period of 2 weeks showed no evidence of infection after 4 weeks, or developed only a minute swelling at the point of inoculation. These minute swellings consisted of typical tumor cells of arrested development. Control plants inoculated from the same sub-culture developed large galls in 4 weeks. The results of these experiments are cited as proof that the effect of Röntgen rays on malignant tumors is an inhibition of the proliferating power of the tumor cells and not their destruction. The therapeutic value of the X-ray treatment before and after operation for cancer is pointed out.—*R. Nelson.*

1431. LEVINE, MAX. **Notes on Bact. coli and Bact. aerogenes.** Amer. Jour. Public Health 11: 21-23. 1921.—It is reported that in making counts of *Bacterium aerogenes* the growth of *B. coli* can be repressed by suitable concentration of crystal violet or brilliant green, and that lowering the concentration of peptone in the medium increases the toxicity of the dyes.—*C. A. Ludwig.*

1432. MACMILLAN, H. G. **A frost injury of potatoes.** Phytopath. 10: 423-424. 1 pl. 1920.—Small necrotic areas less than 1 millimeter in diameter are produced on leaves of potato plants. By experimental data the trouble is shown to be due to frost.—*H. H. McKinney.*

1433. MACMILLAN, H. G., AND L. P. BYARS. **Heat injury to beans in Colorado.** Phytopath. 10: 365-367. 1 fig. 1920.—The authors report a shrunken and collapsed condition of the stem of bean seedlings which occurred at the ground line. The root systems were found healthy and well developed. No organism was found associated with the affected parts. Meteorological records indicated an air temperature range from 28° F. on June 3 to 104° F. on June 29. The soil temperature 1 inch below the surface registered 113° F. on the latter date. The authors consider the condition described to have arisen from high temperature.—*W. B. Tisdale.*

1434. NORTON, J. B. S., AND C. C. CHEN. Some methods for investigating internal seed infection. *Phytopath.* 10: 399-400. 1920.—The authors outline a method of seed disinfection consisting in pre-soaking, treating in an alcoholic solution of corrosive sublimate followed by a thorough washing in ethyl alcohol and finally in sterile water.—*H. H. McKinney.*

1435. WEIR, J. R. Note on the pathological effect of blazing trees. *Phytopath.* 10: 371-373. 1920.—The writer records the prevalence of sporophores of various heart-rotting fungi on blazes on resinous and non-resinous species of conifers in Montana and Idaho. Eighty-six per cent more sporophores were found on the resinous group than on the non-resinous group.—*C. J. Humphrey.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1020, 1295, 1308)

1436. BEYTHIEN, A., UND H. HEMPEL. Ueber Rangoonbohnen. [Rangoon beans.] *Pharm. Zentralhalle* 61: 295-296. 1920.—Samples (226) of Rangoon beans were examined of which 90 per cent contained less than 0.015 per cent of hydrocyanic acid. Of these, 73 per cent contained between 0.006 and 0.015 per cent of the acid. No sample contained more than 20 mg. per 100 gm.—*H. Engelhardt.*

1437. BEYTHIEN, A., UND H. HEMPEL. Ueber das Vorkommen von Rangoonbohnen im Kleinhandel. [The occurrence of the Rangoon bean in retail trade.] *Pharm. Zentralhalle* 61: 27-29. 1920.—Although the German government has prohibited the importation of the bean on account of some cases of poisoning which had been reported, small quantities of the bean had found their way into Germany. The authors report on analyses carried out with several samples and find that the percentage of hydrocyanic acid in the bean is not by far as great as is generally reported. They found from 0.00075 to 0.0054 per cent in these products. Furthermore, they state, most of the acid is lost in boiling the bean.—*H. Engelhardt.*

1438. BRAUN, HANS. Ueber Quellstifte aus Laminariastielen und Tupeloholz. [Dilating tents made of Laminaria stems and Tupelo wood.] *Pharm. Zentralhalle* 61: 586-591. *Fig. 4.* 1920.—An account of the history of dilating bougies made of the stems of *Laminaria* and Tupelo wood and a microscopical and biologic description of the material are given. It is stated that the stems of *Laminaria hyperborea* Foslie are more suitable for making tents than those of *L. Cloustonia* and *L. stenophylla*. Tents made of Tupelo wood, especially when they are varnished as is usually the case, are of little value, because they possess only a very slight swelling power. Requirements for Laminaria bougies and distinctive characteristics of Tupelo wood bougies are given.—*H. Engelhardt.*

1439. GRIFFITHS, E. L. Cocoa husks as a fodder. *Agric. Gaz. New South Wales* 32: 55-56. 1921.—Review of literature shows that cocoa husks contain alkaloids, theobromin and caffen, which produce lethal effects when husks are fed in normal forage quantity. Husks must be fed sparingly, if at all.—*L. R. Waldron.*

1440. GRIMME, CLEMENS. Ist die Rangoonbohne wirklich giftig oder doch wenigstens als schädlich für den menschlichen Genuss anzusprechen? [Is the Rangoon bean really poisonous or must it at least be considered as a food detrimental to man?] *Pharm. Zentralhalle* 61: 159-166. 1920.—The results of analyses of numerous samples of the bean have shown that the hydrocyanic acid in it averages less than 0.02 per cent, that the acid is lost in boiling the beans with water and that the bean is, therefore, harmless. A few samples showed a rather high percentage of hydrocyanic acid, but these were derived from wild-growing plants. From cultivated plants, beans with considerably less acid are obtained.—*H. Engelhardt.*

1441. GRIMME, CLEMENS. Ueber den Alkaloidgehalt von Herbstzeitlosensamen und ueber das Herbstzeitlosensamen Öl. [The alkaloidal content of *Colchicum* seed and the fixed oil in *Colchicum* seed.] Pharm. Zentralhalle 61: 521-524. 1920.—By extracting the seed with ether 17.6 per cent of a light-brown odorless semi-drying oil was obtained which had a pungent taste. The following constants were found: Sp. gr., 0.9176; congealing point, 9°C.; refractive index, 1.4642; acid number, 20.3 (free oleic acid 10.2 per cent); saponification number, 184; iodine number, 128.5; and unsaponifiable substances, 0.71 per cent. The fatty acids obtained from the oil were pale yellow in color, melted at 24°C., congealed at 22.5°C., had a refractive index of 1.4646, a saponification number of 187.6, an iodine value of 131, and an average molecular weight of 300.3. It was also found that the percentage of colchicine in the seeds is in inverse proportion to the weight of the seeds.—H. Engelhardt.

1442. KARLSSON, KARL ALGOT. *Matricaria discoidea* DC. Svensk Farm. Tidskr. 24: 517-521, 533-538. 1920.—*Matricaria discoidea* DC. (*Matricaria suaveolens* Buch., *Chrysanthemum suaveolens* Asch., *Chamomilla discoidea* J. Gay) is recommended as a substitute for the less easily obtainable camomile (chamomile), *Anthemis nobilis*. The paper includes an historical review, the comparative chemical properties, and a macroscopic and microscopic study of the 2 plants.—A. M. Hjort.

1443. MARSH, C. DWIGHT, AND A. B. CLAWSON. *Daubentonia longifolia* (Coffee bean), a poisonous plant. Jour. Agric. Res. 20: 507-513. 1920 [1921].—The seeds of *D. longifolia* (*Sesbania cavanillesii*) of the Leguminosae are very poisonous to sheep. The smallest dose of seed producing death was 0.11 pound per hundredweight of animal. The toxic principle is not named.—D. Reddick.

1444. ROSENTHALER, L. Ueber die Beziehungen zwischen dem Gewicht von Drogen und ihrem Gehalt an giftigen Stoffen. [The relation between the weight of drugs and their content of poisonous principles.] Pharm. Zentralhalle 61: 629-630. 1920.—In an article concerning the relation between the weight of *Colchicum* seeds and the amount of colchicine which they contain GRIMME states that no literature is available on the subject. Rosenthaler, however, claims that the fact that specifically lighter drugs contain a higher percentage of active principles than specifically heavier drugs, has been known for a long time and that the Swiss pharmacopoeia for this reason excludes ergot of more than 25 mm. length. He further states that in many other drugs the amount of active principles is in inverse proportion to the weight, as for instance in bitter almonds, areca nuts, calabar beans, aconite root, belladonna root, etc. [See also Bot. Absts. 8, Entry 1441].—H. Engelhardt.

1445. VESTLIN, CONRAD. *Pimpinella-Saponin*. Pharm. Zentralhalle 61: 77-78. 1920.—*Pimpinella saxifraga* contains about 2.5 per cent of crude saponin and about 1 per cent of pure saponin, which possesses the formula $C_{23}H_{36}O_{18} + 2H_2O$ and, therefore, belongs to the class of saponins of the general formula $C_nH_{2n-10}O_{18} + 2H_2O$. In no other plants of the Umbelliferae have saponins been found.—H. Engelhardt.

1446. VIEHOEVER, ARNO, JOSEPH F. CLEVINGER, AND CLARE OLIN EWING. Studies in mustard seeds and substitutes: I Chinese colza (*Brassica campestris chinoleifera* Viehovever). Jour. Agric. Res. 20: 117-139. Pl. 10-19. 1920.—Seed imported extensively in U. S. A. as rape seed but offered for sale as mustard seed is really *Brassica campestris chinoleifera* n. var. Means of identification of seeds by microscopic examination are described in detail. Plants have been grown from seed and the characteristics established. The variety is closely related to the colza group (*Brassica campestris*).—The volatile oil obtained from the seed is crotonyl isothiocyanate. It is not a suitable substitute for mustard oil, in respect to either condimental, bactericidal, or medicinal values.—The fixed oil is of the general composition of the rape oils, and amounts to more than 40 per cent. The seed should prove useful as pressed oil cake, the leaves as greens, and the plants as forage.—Full descriptions and illustrations are presented and taxonomic problems discussed. A bibliography of 52 titles is appended.—D. Reddick.

1447. WESTER, D. H. Ueber den merkwürdigen Verlauf der Ureasewirkung eines Soya-bohnenextraktes beim Erwärmen auf 37°. [The peculiar action of the urease in soybean extract when heated at 37°C.] Pharm. Zentralhalle 61: 293-295. 1920.—The author found that the action of urease on soybean extract changes considerably when kept at 37°; thus he found that while the urea number (i.e., the number of mg. of urea converted by the urease solution) was 126 on the first day, after 7 days' standing it had been reduced to 47 and after 14 days to 38.2, and had increased after 21 days to 90, declining after 26 days to 85, and after 35 days to 60.3.—*H. Engelhardt.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 769, 770, 778, 779, 785, 791, 805, 812, 942, 944, 948, 1069, 1116, 1118, 1147, 1163, 1211, 1229, 1357, 1369, 1374, 1375, 1376, 1429, 1430, 1431, 1445, 1447, 1509, 1514, 1518, 1526, 1529, 1533, 1535, 1574.)

GENERAL

1448. CLARK, W. M. The determination of hydrogen ions. 317 p., 38 fig. Williams & Wilkins Co.: Baltimore, 1920.—In his preface the author points out interesting biological and chemical investigations as landmarks in the comprehension and measurement of "acidity," and while recognizing that the hydrogen ion may be a center of great interest because it is a dissociation product of so many compounds with which the biochemist deals, he also indicates that it is a factor which should not be permitted to "obscure possibilities of broader generalizations."—The book is written in response to the need of a detailed exposition of the two methods—colorimetric and electrometric—in daily use to determine hydrogen-ion concentration. Accordingly, Chapter I is concerned with some of the general relations among acids and bases, including a discussion of the P_H scale and buffer action. This is followed by captions (pp. 38-96) in which are presented discussions of the colorimetric procedure, theory of indicators, choice of indicators, buffer solutions, protein and salt errors, and the value and limitations of approximate determinations with indicators. Chapters VIII-XVII deal with the electrometric method, including the theoretical aspects as well as detailed descriptions of the hydrogen and calomel electrodes and electrode vessels, and the potentiometer and equipment, also errors of measurement, and standardization methods. A brief chapter relating to supplementary methods is followed by a more elaborate presentation of "applications" intended primarily for the biochemist and biologist, but considered by the author as merely a "cursory review" and as an index to the bibliography. The bibliography extends over 64 pages and includes some titles as late as 1919 and 1920. There are 9 pages of tables.—*B. M. Duggar.*

1449. THATCHER, R. W. The chemistry of plant life. xvi + 268 p. McGraw-Hill Book Co.: New York, 1921.—This book is intended to serve primarily as a handbook dealing with the constitution of the compounds involved in plant growth, likewise the conditions under which such compounds undergo chemical changes in the protoplasm. After a brief chapter on "plant nutrients," encompassing the mineral nutrients and their roles, the author sets forth in a few pages (chapter 2) on the organic components of plants the significance of the materials to be treated, and classifies the important groups of compounds as follows: The carbohydrates and their derivatives, the glucosides and tannins; the fats and waxes; the essential oils and resins; organic acids and their salts; the proteins; the vegetable bases and alkaloids; and the pigments. Ten of the remaining 16 chapters (150 pages) are devoted to the description and discussion of these groups of substances. These sections are preceded by a chapter on photosynthesis, in which there is elaborated the trend of investigations following BAEYER'S suggestion, now frequently known as Baeyer's formaldehyde hypothesis. The remaining 5 chapters deal with enzymes, the colloidal condition, the physical chemistry of protoplasm, accessory stimulating agencies, and adaptations.—*B. M. Duggar.*

PROTOPLASM, MOTILITY

1450. ANONYMOUS. The components and colloidal behavior of protoplasm. *Sci. Amer. Monthly* 2: 271-272. 1920. [From *Science* 51: 595-596. 1920.]

DIFFUSION, PERMEABILITY

1451. KNIGHT, R. C. Plant physiology. *Sci. Prog.* [London] 15: 200-206. 1920.—This is a brief review of some important papers dealing with storage and translocation of the food products in plants.—*J. L. Weimer.*

1452. MANN, H. An apparatus for continuous dialysis or extraction. *Jour. Biol. Chem.* 44: 207-209. 1920.

1453. MUKERJI, J. N. The excretion of toxins from the roots of plants. *Agric. Jour. India* 15: 502-507. 1920.—The conclusions of FLETCHER (*Mem. Dept. Agric. India, Bot. Ser.* 2³: 1-16. 1908) that plants secrete toxic substances are held to be due to the use in his experiments of too concentrated a solution. Data of experiments with Knop's nutrient solution having a total salt concentration of 0.11 per cent are presented, where wheat, cajanus, and grain were grown. The solution which had previously grown a set of plants supported better growth than did the fresh solution.—*J. J. Skinner.*

1454. SHULL, C. A. Absorption limits. [Rev. of: HARVEY, R. B., AND R. H. TRUE. Root absorption from solutions at minimum concentrations. *Amer. Jour. Bot.* 5: 516-521. 1918 (see *Bot. Absts.* 2, Entry 547).] *Bot. Gaz.* 68: 486. 1919.

WATER RELATIONS

1455. LANGDON, LADAMA M. Wood structure and conductivity. [Rev. of: (1) FARMER, J. B. On the quantitative differences in the water-conductivity of the wood in trees and shrubs. *Proc. Roy. Soc. London B* 90: 218-250. 1918 (see *Bot. Absts.* 2, Entries 305, 306; 4, Entry 1413). (2) HOLMES, M. G. Observations on the anatomy of ash-wood with reference to water-conductivity. *Ann. Botany* 33: 255-264. 7 fig. 1919 (see *Bot. Absts.* 3, Entry 1109).] *Bot. Gaz.* 68: 483-484. 1919.

MINERAL NUTRIENTS

1456. MOLLARD, M. Action des acides sur la composition des cendres du *Sterigmatocystis nigra*. [Action of acids on the composition of the ash of *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 169: 990-993. 1919.—The author has previously demonstrated that the accumulation of ash in *Sterigmatocystis nigra* is much less when ammonium chloride replaces ammonium tartrate as the source of nitrogen. In both cases the acidity increased during the first period of growth, but when the sugar of the culture medium disappears, acidity decreases when ammonium is used, because of the utilization of the latter. On the other hand, the use of ammonium chloride results in the accumulation of hydrochloric acid, which is not utilized by the fungus. During the first 2 days the amount of mineral utilized by the fungus is more than doubled when ammonium tartrate is used as a source of nitrogen. The author regards this result as due to the effect of hydrochloric acid on the permeability of the fungal cells. By means of analyses of the ash of fungi grown with ammonium tartrate and ammonium chloride as sources of nitrogen, the author finds that the mycelium of *Sterigmatocystis* grown on the ammonium tartrate solution contains ash in about the proportions found in the storage organs of higher plants. Only a small part of the sulphur and magnesium of the culture medium was absorbed, but all the phosphorus and potassium of the solution was recovered from the mycelium. The ash of the fungus grown on the ammonium chloride medium was found to contain reduced amounts of sulphur, potassium, and especially magnesium. The author finds that the presence of hydrochloric acid in the medium reduces the permeability of the plasma membrane in an unequal fashion, the permeability to some substances being notably reduced. Attention is also called to the fact that the morphological

characteristics of the fungus, such as suppression of conidia formation, which may be altered by certain deficiencies of the culture medium, may also be brought about by factors leading to alteration in the permeability of the cells.—*V. H. Young.*

PHOTOSYNTHESIS

1457. GRADENWITZ, A. **Carbonic acid gas to fertilize the air.** *Sci. Amer.* 123: 549, 557. 3 fig. 1920.—An account is given of some experiments carried out on a commercial scale, in which greenhouses were supplied with purified exhaust gases from blast furnaces. The various plants showed increased growth and yield of fruits of 70 per cent to 180 per cent more than in the case of control plants.—*Chas. H. Otis.*

1458. STOLL, ARTHUR. **Ueber die Assimilation der Kohlensäure.** [On the assimilation of carbon dioxide.] *Vierteljahrsschr. Naturforsch. Ges. Zurich* 63: 512–543. 1918.—The author gives essentially the following summary: The carbon dioxide diffuses from the intercellular spaces through the cell walls, is brought into a higher concentration by a chemical reaction in the cell, and reaches the chlorophyll in a form especially susceptible to reaction. The carbonic acid as such, or a carbonic acid derivative, is then taken up by the chlorophyll. The chlorophyll molecule with the carbonic acid absorbs light and is surrounded by a specific peroxide enzyme which splits off molecular oxygen. The first free product of assimilation is carbohydrate material whose simplest representative is formaldehyde.—*John H. Schaffner.*

METABOLISM (GENERAL)

1459. ANDERSON, R. J. **Composition of inosite phosphoric acid of plants.** *Jour. Biol. Chem.* 44: 429–438. 1920.—The composition of phytic acid of plants as determined from the analyses of salts of this acid corresponds to inosite hexaphosphoric acid.—*G. B. Rigg.*

1460. COOK, M. J., V. MIX, AND E. O. CULVYHOUSE. **Hemotoxin production by the *Streptococcus* in relation to its metabolism.** *Jour. Infect. Diseases* 28: 93–121. 1921.—Hemotoxin (hemolysin) production by *Streptococcus* is due to, and controlled by, conditions that influence the growth of the organism.—*Selman A. Waksman.*

1461. DOBBIN, L. **On the presence of formic acid in the stinging hairs of the nettle.** *Proc. Roy. Soc. Edinburgh* 39: 137–142. 1919.—Formic acid was demonstrated in the contents of the hairs by its conversion into lead formate, which could be distinguished by means of a polarizing microscope. Filter papers impregnated with barium carbonate were pressed upon nettle leaves. The papers were extracted with water and the filtered extract acidified with phosphoric acid and then distilled. The distillate was acid in reaction and could be converted into the lead salt.—*Joanne L. Karrer.*

1462. HAAS, P. **Organic chemistry.** *Sci. Prog.* [London] 14: 378–380, 565–567. 1920.—A brief review of some of the more recent literature on this subject among which are papers dealing with the coloring matter of plants and one by DOBBIN (*Proc. Roy. Soc. Edinburgh* 39: 137–142. 1919—see preceding entry) on the active agent in the stinging hairs of nettles.—*J. L. Weimer.*

1463. HAAS, P. **Organic chemistry.** *Sci. Prog.* [London] 15: 22–24. 1920.—A brief review of a paper by HAWORTH (*Jour. Chem. Soc.* 117: 199. 1920) on the constitution of disaccharides is included.—*J. L. Weimer.*

1464. HAAS, P. **Organic chemistry.** *Sci. Prog.* [London] 15: 192–194. 1920.—The diastatic properties of formaldehyde, a new theory of carbon dioxide assimilation, and the gas contained in the floats of the giant Pacific kelp are mentioned.—*J. L. Weimer.*

1465. LAPICDUE, LOUIS. Variation saisonnière dans la composition chimique des algues marines. [Seasonal variation in the chemical composition of marine algae.] Compt. Rend. Acad. Sci. Paris 169: 1426-1428. 1919.—*Laminaria flexicaulis* was selected as typical material for this work. Analysis of the carbohydrate content and of the soluble and insoluble ash showed that there is a distinct seasonal variation in the chemical composition of this alga. From the spring equinox until September there is a steady increase in soluble carbohydrates from 1.1 to 33.9 per cent. At the same time there is a decrease in the soluble ash from 28.2 to 13.4 per cent and of the insoluble ash from 7.5 to 4.6 per cent. Soluble carbohydrates increased from the end of winter to summer in the ratio of 2 to 81. The carbohydrates present are mannite [included for convenience in this group] and laminarine. The author suggests that the disappearance of soluble ash with the increase in soluble carbohydrates may be simply an "isotonic substitution."—V. H. Young.

1466. MÖBIUS, M. Über die Farben der Blumen. [On the colors of flowers.] Ber. Senckenberg. Naturf. Ges. Frankfurt. a. M. 49: 108-109. 1919.—In this report of a lecture given in February, 1919, the biological significance of colors in flowers is stated to be an unsolved problem, if insects are color-blind. In producing the various color-effects the following pigments are the only ones involved: Chlorophyll, anthoxanthin, anthocyan, anthochlor, and anthophaein. These occur, however, in many different arrangements.—A. W. Evans.

1467. MOYCHO, VENCESLAS. Recherches sur le rôle physiologique de la saponine. [Investigations concerning the physiological rôle of saponin.] Rev. Gen. Bot. 32: 449-459. 1920.—Investigations were made of the amount of saponin present at different stages of the development of *Saponaria officinalis*. It was found that the relative amount of saponin present was approximately constant until the time of flowering and seed production, when the amounts present decreased. The glucoside was again accumulated in the roots in the autumn and winter after the foliage had died. The author concludes that the glucoside may be utilized by the reproductive organs of the plant. The accumulation does not depend on the emigration of the glucoside from the leaves but is due to its formation in the storage organs of the plant.—J. C. Gilman.

1468. TANRET, GEORGES. Sur la miellée du peuplier. [On the honey dew of poplar.] Compt. Rend. Acad. Sci. Paris 169: 873-874. 1919.—The "honey dew" which collects on the leaves of *Populus nigra* was collected from 6 kilos of leaves and analyzed by appropriate methods to determine its carbohydrate content. Twenty-two grams of "melezitose" were secured from this amount of leaves. "Honey dew" of poplars appears to be formed by the excretion of minute droplets by plant lice.—V. H. Young.

1469. WITZEMANN, E. J. Disodium phosphate as a catalyst for the quantitative oxidation of glucose to carbon dioxide with hydrogen peroxide. Jour. Biol. Chem. 45: 1-22. 1921.—Glucose may be quantitatively oxidized to CO₂ with hydrogen peroxide in the presence of a phosphate mixture. Disodium phosphate plays the rôle of a typical catalyst in the oxidation.—G. B. Rigg.

METABOLISM (NITROGEN RELATIONS)

1470. DAKIN, H. D. Amino acids of gelatin. Jour. Biol. Chem. 44: 499-529. Fig. 1. 1920.—The products of the hydrolysis of gelatin were found to contain 13 amino acids. The ones present in largest amounts were glycine, hydroxyproline, proline, alanine, and arginine.—G. B. Rigg.

1471. JOHNS, C. O., AND C. E. F. GERSDORFF. The globulin of the cohune nut, *Attalea cohune*. Jour. Biol. Chem. 45: 57-67. 1921.—Cohune nut globulin contains all of the basic amino acids known to exist in proteins, being high in arginine and lysine.—G. B. Rigg.

1472. JOHNS, C. O., AND D. B. JONES. Some amino-acids from the globulin of the coconut as determined by the butyl alcohol extraction method of Dakin. Jour. Biol. Chem. 44:

283-290. 1920.—The following amino acids were found in the aqueous solution remaining after the products of hydrolysis had been subjected to butyl alcohol extraction (Dakin's method): Glutaminic acid, 19.07 per cent; aspartic acid, 5.12 per cent; alanine, 2.67 per cent; serine 1.76 per cent.—*G. B. Rigg*.

1473. JOHNS, C. O., AND N. C. WATERMAN. Some proteins from the mung bean, *Phaseolus aureus* Roxburgh. *Jour. Biol. Chem.* 44: 303-317. 1920.—The mung bean contains about 21.74 per cent of protein. This yields 2 globulins distinguished from each other by marked differences in their percentages of the basic amino acids.—*G. B. Rigg*.

1474. JONES, D. B., AND C. O. JOHNS. Hydrolysis of the globulin of the coconut, *Cocos nucifera*. *Jour. Biol. Chem.* 44: 291-301. 1920.—The amino acids resulting from the hydrolysis were determined. Glytaminic acid was the most abundant.—*G. B. Rigg*.

1475. MILLER, E. R. Dihydroxyphenylalanine, a constituent of the velvet bean. *Jour. Biol. Chem.* 44: 481-486. 1920.

1476. PARIS, G. Studi e ricerche sulla biochimica del tabacco. III. Sul metabolismo dell'azoto nello sviluppo della foglia di tabacco. [The biochemistry of tobacco. III. Nitrogen metabolism in the growing leaf.] *Staz. Sper. Agrarie Ital.* 53: 81-96. 1920.—The direct connection existing between nicotine production and nitrogen nutrition was demonstrated by cutting tobacco leaves longitudinally in two equal parts and allowing one part to float on distilled water, while the other was floated upon a 0.25 per cent solution of NH_4Cl in diffuse light. The content of nicotine of the ammonium chloride portions was found in two cases to be 2.22 and 2.01 respectively, while the natural nicotine content of the water portions was 1.88 and 1.54 per cent respectively.—The physiological effect of "topping" is demonstrated. In the natural plant the total nitrogen and also the amide nitrogen (about $\frac{1}{3}$ the total amount) increased from the basal to the 5th whorl, while the nicotine content, averaging $\frac{1}{3}$ the quantity of total nitrogen, diminished. In the "topped" plant total nitrogen and nicotine content run about parallel and the latter is so increased in amount as to exceed total nitrogen, and a low content of amide nitrogen is present.—As for soluble nitrogen, the observation was made that, while in the "topped" plants the greater proportion was in the form of basic and protein substances, in the natural plants the greater part of the soluble nitrogen was in the amidic form. Therefore, "topping" of the plants leads to a modification of the chemical composition of the leaves and the stem with an accumulation of nicotine and strong diminution of amides. According to the author, nicotine is a condensation product, the formation of which is dependent upon the amides, light, and chlorophyll.—*A. Bonazzi*.

METABOLISM (ENZYMES, FERMENTATION)

1477. ARZBERGER, C. F., W. H. PETERSON, AND E. B. FRED. Certain factors that influence acetone production by *Bacillus acetoethylicum*. *Jour. Biol. Chem.* 44: 465-479. *Fig. 1-2*. 1920.—This organism ferments glucose, sucrose, potato starch, and xylose in a peptone-phosphate medium with the production of acetic, formic, and lactic acids, ethyl alcohol, acetone, and carbon dioxide.—*G. B. Rigg*.

1478. BOURQUELOT, EM., ET H. HÉRISSEY. Présence dans le Mélilot et l'Asperule odorante, de glucosides fournissant de la coumarine sous l'action hydrolysante de l'émulsine. [The presence in Melilotus and Asperula odorata of glucosides furnishing coumarine when hydrolyzed with emulsin.] *Compt. Rend. Acad. Sci. Paris* 170: 1545-1550. 1920.—Coumarine is secured by treating the glucosides of these plants with enzymes extracted from them. The same result is obtained if emulsin is used, both sugar and coumarine being formed from the glucosides.—*C. H. Farr*.

1479. BRADLEY, H. C., AND H. FELSHER. Studies of autolysis. VI. Effect of certain colloids upon autolysis. *Jour. Biol. Chem.* 44: 553-561. 1920.

1480. GARINO-CANINA, E. Azione dei fosfati nella fermentazione alcoolica. [The action of phosphates in alcoholic fermentation.] Staz. Sper. Agrarie Ital. 53: 67-78. Fig. 1. 1920.—A yeast (no. 121) of the collection of the laboratory is cultivated in a medium made up of saccharose, tartaric acid, potassium carbonate, potassium sulphate, magnesium sulphate, calcium chloride, and asparagine to which varying quantities of potassium phosphate have been added before sterilization. [The author does not mention which of the 3 phosphates was used.] After incubation the cultures are filtered and alcohol, acetic acid, and yeast substance are determined and compared with the quantity of carbon dioxide produced. The results obtained are summarized in 2 tables and a graph, whence the conclusions are reached that even a molecular concentration of $0.000052 \text{ PO}_4'''$ is sufficient to bring about a normal development and alcohol formation while a concentration of $0.0104 \text{ mol. PO}_4'''$ gives the best results. When alcohol formation is taken as a standard, it is found that greater concentrations are not quite so favorable, while if the actual weight of dry yeast is considered, then growth is a direct function of phosphate concentration within the limits studied. Experiments made with compressed yeast and dipotassium phosphate in increasing concentrations, as also with acetone yeast (*zymin*), gave results which the author considered confirmatory to the results obtained with living yeast although quite irregular.—A. Bonazzi.

1481. GREY, EGERTON CHARLES. The enzymes of *B. coli communis* which are concerned in the decomposition of glucose and mannitol. Part IV.—The fermentation of glucose in the presence of formic acid. Proc. Roy. Soc. London B, 91: 294-305. 1920.—This organism breaks glucose down into 3 groups of products: (1) Lactic acid; (2) acetic acid, alcohol, and succinic acid; and (3) carbon dioxide, hydrogen, and formic acid. Production of lactic acid is not correlated with that of the other groups, which are in turn, however, closely related. This relation, due to the rôle of nascent hydrogen in forming alcohol, is here demonstrated for the first time *in vivo*. The addition of formic acid as calcium formate greatly increases the production of hydrogen and of carbon dioxide, instead of inhibiting their formation.—Paul B. Sears.

1482. KNUDSON, L., AND R. S. SMITH. Secretion of amylase by plant roots. Bot. Gaz. 68: 460-466. 2 fig. 1919.—Neither *Zea Mays* nor *Pisum arvense* is capable of utilizing soluble starch, nor was there found in any experiment an appreciable secretion of amylase by the roots.—H. C. Cowles.

1483. KOPELOFF, NICHOLAS, AND LILLIAN KOPELOFF. Factors determining the keeping quality of cane sugar. Louisiana Agric. Exp. Sta. Bull. 170. 63 p., 1 fig. 1920.—This is practically a reprint of several articles appearing in different journals (see Bot. Absts. 4, Entry 1513; 5, Entries 920, 2202) with conclusions regarding the importance of certain species of *Penicillium* and *Aspergillus* in the deterioration of sugar.—C. W. Edgerton.

1484. KOPELOFF, NICHOLAS, AND H. Z. E. PERKINS. The deterioration of Cuban raw sugars in storage. Louisiana Planter and Sugar Manufacturer 64: 413-415. 1920.—Cuban raw sugars stored for $5\frac{1}{2}$ months in New Orleans deteriorated to a considerable extent. During the same period there was an increase in the number of microorganisms present.—C. W. Edgerton.

1485. KOPELOFF, NICHOLAS, H. Z. E. PERKINS, AND C. J. WELCOME. Further studies in the deterioration of sugars in storage. Jour. Agric. Res. 20: 637-653. 1921.—Bags of Cuban raw sugars of 10 different lots with moisture ratios varying from 0.18 to 0.5 were stored in a large warehouse and were analyzed chemically and bacteriologically at the beginning of storage and after 4 and 8 weeks respectively. There was a loss in polarization in most of the sugars at the end of each period, and this was usually accompanied by a gain in reducing sugars and in moisture content. From the data secured a correlation is established between deterioration and the number of microorganisms present and between deterioration and the moisture ratio. [See Bot. Absts. 7, Entry 1343.]-D. Reddick.

1486. SATAVA, JAN. **Alcoholic fermentation in sugar juices.** Sugar 22: 196-198. Fig. 1-4. 1920.—[Translated from the report of the Bohemian Technical High School, Prague, by R. V. Keller.] Several strains or species of the genus *Zygosaccharomyces*, closely related to *Z. Barkeri*, are capable of fermenting concentrated solutions of sugar. The fermentation produced is rather vigorous, though the amount of alcohol produced is not large. In one experiment using a 65 per cent sugar solution, 2.69 per cent of alcohol was obtained.—C. W. Edgerton.

1487. WESTER, D. H. **Ureasegehalt von holländischen Samen und von verschiedenen Arten Soyabohnen.** [Urease content of Dutch seeds and of different kinds of soy beans.] Pharm. Zentralhalle 61: 377-382. 1920.—A great number of seeds of plants growing in Holland and the Dutch possessions were examined. The seeds of *Cytisus* have a high urea number. In seeds of different species of the same genus the urea number varies considerably in such genera as *Geranium*, *Trifolium*, *Vicia*, and *Phaseolus* for instance. In *Vicia hirsuta*, *V. cracca*, *V. villosa*, *V. angustifolia*, and *V. sativa* no urease was present, while in *V. silvatica* there was a high urea number. Urease was present in all the different kinds of soybeans, as found by the examination of 48 species. Very remarkable was the fact that beans which had been kept for 17 and 31 years still exerted a strong urease action.—H. Engelhardt.

METABOLISM (RESPIRATION)

1488. HAGGARD, H. W., AND Y. HENDERSON. **Hemato-respiratory functions. VII. The reversible alterations of the H_2CO_3 : $NaHCO_3$ equilibrium in blood and plasma under variations in CO_2 tension and their mechanism.** Jour. Biol. Chem. 45: 189-198. 1 fig. 1920.—Hemoglobin plays almost as large a part in the transportation of CO_2 as it does in that of oxygen, though it does not itself combine directly with CO_2 to any great extent.—G. B. Rigg.

ORGANISM AS A WHOLE

1489. BRANDT, K. **Über den Stoffwechsel im Meere.** [Metabolism in the sea.] Schriften Naturwiss. Ver. Schleswig-Holstein 17: 193-194. 1920.—A report is given here of a lecture on the periodicity of the plankton algae, especially the diatoms. Definite relations are shown to exist between the abundance of these organisms and the amount of certain nutritive substances present in the sea.—A. W. Evans.

1490. KÜSTER, E. **Der Rhythmus im Leben der Pflanze.** [Rhythm in the life of the plant.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 69. 1919.—In this report of a lecture delivered in February, 1916, various periodic processes in plants are ascribed, wholly or very largely, to an autonomous rhythm inherent in the organism. Among these processes the following are included: Alternation of growing and resting periods, alternation of day and night positions in many leaves and flowers, the formation of fairy rings by molds, and the development of annual rings in woody plants.—A. W. Evans.

1491. ROGERS, J. B. **Studies on the viability of the tubercle bacillus.** Amer. Jour. Public Health 10: 345-347. 1920.—The author describes experiments which go to show that the tubercle bacilli in the dust of hospital wards and in morgues are viable and infective.—C. A. Ludwig.

1492. TUBEUF. **Absterben der Ulmenäste im Sommer 1920.** [Dying-off of the branches of the elm in the summer of 1920.] Naturw. Zeitschr. Forst- u. Landw. 18: 228-230. 1920.—This phenomenon was observed to an equal extent in 1918, and is due to the habit, characteristic of the elm, of flowering very abundantly every 2nd or 3rd year. The blossoms appear before the foliage in the spring, and, although the green fruits may temporarily act as leaves before becoming ripe, they deprive the leaf buds of their required nourishment, and, as often happens, the foliage never develops so that the branches, after the fruit drops, are bare. Twigs and branches remain green just as long as they bear foliage,—if the foliage does not develop, the branches die off, or die back to the outermost foliage.—J. Roesser.

GROWTH, DEVELOPMENT, REPRODUCTION

1493. SALISBURY, E. J. [Rev. of: MACDOUGAL, D. T. *Hydration and growth*. Carnegie Inst. Washington Publ. 297. vi + 176 p., 52 fig. 1920 (see Bot. Absts. 5, Entry 2223).] Sci. Prog. [London] 15: 319. 1920.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1494. HENDRICKS, H. V. Torsion studies in twining plants. Bot. Gaz. 68: 425-440. 6 fig. 1919.—These studies were made on *Phaseolus multiflorus* and *Tiniaria Convolvulus* with a modified form of auxanometer, the latter being so arranged that the growing internodes were stretched vertically in order to eliminate twining. An estimate of torsional rigidity at different lengths was made, and studies were begun on antidromous torsion. As the internode begins to elongate it twists but little, but later it twists more rapidly; eventually there is a slight reverse twist. Rigidity or resistance to twisting increases but slowly until nearly the end of the period of elongation, when there is a sudden increase. The final increase in rigidity accompanies lignification.—H. C. Cowles.

1495. MÖBIUS, M. Die Pflanze und die Schwerkraft. [The plant and gravity.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 78-79. 1919.—In this report of a lecture on geotropic phenomena the contrast is brought out between the uniformity of the actual sensory organs and the diversity of the responses.—A. W. Evans.

GERMINATION, RENEWAL OF ACTIVITY

1496. CROCKER, WILLIAM. After-ripening and germination of rice. [Rev. of: KONDO, MONTARO. Ueber Nachreife und Keimung verschieden reifer Reiskörner. Ber. Ohara Inst. Landw. Forsch. 1: 361-387. 1919 (see Bot. Absts. 3, Entry 2805).] Bot. Gaz. 68: 484. 1919.

1497. THIEL, A. F., AND FREEMAN WEISS. The effect of citric acid on the germination of the teliospores of *Puccinia graminis tritici*. Phytopath. 10: 448-452. 1 fig. 1920.—Means were sought for shortening the rest period of *Puccinia graminis Tritici* teliospores. Soaking in 1 per cent citric acid hastened after-ripening so that germination occurred in December, January, and February. Spores treated the optimum time (15 minutes) produced sporidia capable of infection.—E. K. Seymour.

1498. WEST, CYRIL. Plant physiology. Sci. Prog. [London] 15: 34-39. 1920.—This paper contains a brief review of the more recent literature on dormancy, or delayed germination of seeds.—J. L. Weimer.

TEMPERATURE RELATIONS

1499. ANONYMOUS. The effect of high temperatures on fruits. Sci. Amer. Monthly 2: 272. 1920.—This is a summary of the results of OVERHOLSER and TAYLOR, as set forth in their article in the Bot. Gaz. 69: 274-296. 1920.—Chas. H. Otis.

1500. LIVINGSTON, B. E., AND H. S. FAWCETT. A battery of chambers with different automatically maintained temperatures. Phytopath. 10: 336-340. 1920.—The water is electrically thermostated at the extremes, the intermediate chambers assuming temperatures determined by the temperature-gradient that exists between the 2 ends.—James Johnson.

RADIANT ENERGY RELATIONS

1501. ANONYMOUS. Plant movement and radiant energy. Sci. Amer. 123: 631. 1920.

1502. PRINGSHEIM, E. G. Vom Lichtsinn der Pflanzen. [Light perception by plants.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 57-58. 1919.—A synopsis of a lecture

on light perception in plants is here given. The various types of phototropic phenomena are described and explained, and the great delicacy of the powers of light perception exhibited by plants is presented.—*A. W. Evans.*

1503. TROENDLE, ARTHUR. *Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten.* [The influence of light on the permeability of the plasma-membrane and the method of coefficients of permeability.] *Vierteljahrsschr. Naturforsch. Ges. Zurich* 63: 187-213. 1918.—The results of an earlier contribution (1910) on coefficients of permeability are confirmed. New experiments, in which the quantity of salt taken up in a given time was determined, confirmed the earlier conclusions. The relations between the coefficients of permeability (μ) and the quantity of salt taken up per minute are theoretically derived.—*John H. Schaffner.*

TOXIC AGENTS

1504. VERSCHAFFELT, ED. *Een en ander over de Werking van gasvormige vergiften op planten.* [The action of gaseous poisons on plants.] *Pharm. Weekbl.* 57: 1163-1175. 1920.—The gases may enter the plant by diffusion through the cuticle, which generally covers those organs which have only a limited life; or through the tissue air spaces or the lenticels of the cork tissue, the latter behaving differently with different plants. Trees and shrubs shed their leaves very rapidly when exposed to illuminating gas or the vapors of oil of cloves. Strong quick-acting poisons such as chloroform, hydrochloric acid vapors, and ammonia prevent a meristematic separation of the cells, and the leaves do not fall off until the plant is dead. Some Coniferae with definite cell layers in the needles shed these needles when exposed to chloroform or other poisons. The shedding is the more rapid the more poison is absorbed by the cork. This absorbs in 7 days 334.7 per cent of chloroform, 56.6 per cent of ether, 26.4 per cent of carbon tetrachloride, 176.7 per cent of 10 per cent alcoholic caustic potash solution, and 327.8 per cent of trichloroacetic acid (25 gms. in 10 mls of water). The saponifiable substances in the cutin and suberin appear to play an important rôle in the poisoning of plants by gases. Anthocyan dyes are converted into white isomerids, the color being restored by hydrochloric acid vapors. In some plants enzymes may take an important part in hastening the poisoning. In some cases of poisoning strong odors are developed, for instance, by the action of chloroform on garlic and related plants, where from glucosides present in these plants alkyl sulphides are split off, which can be identified by lead acetate paper.—*H. Engelhardt.*

MISCELLANEOUS

1505. ANONYMOUS. *Presence of copper in food plants.* *Sci. Amer. Monthly* 2: 204. 1920.

1506. WILSON, J. K. *Device for growing large plants in sterile media.* *Phytopath.* 10: 425-429. 1 fig. 1920.—The seeds are sterilized with calcium hypochlorite and germinated in a short glass cylinder partially imbedded vertically in sterile agar contained in a test tube. After the seeds germinate the cylinder containing agar and seedling is lifted out of the tube and set into the mouth of a large flask which contains sterilized nutrient solution. Maize, peas, and oats have been grown to maturity by this method.—*William B. Tisdale.*

1507. ZERBAN, F. W., AND E. C. FREELAND. *The color of sugar cane products and decolorization in factory practice.* *Sugar* 21: 354-359b. 1919.—This is a reprint of *Louisiana Agric. Exp. Sta. Bull.* 165. 32 p. 1919 (see *Bot. Absts.* 3, Entry 815).—*C. W. Edgerton.*

1508. ZERBAN, F. W., Y E. C. FREELAND. *El color de los productos de la cana de azucar y su decoloracion en la practica azucarera.* [The color of sugar cane products and decolorization in factory practice.] *Sugar* 21: 444-447, 494-499. 1919.—This is a translation of *Louisiana Agric. Exp. Sta. Bull.* 165 (see preceding Entry).—*C. W. Edgerton.*

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 772, 773, 774, 775, 805, 806, 810, 811, 813, 814, 935, 1087, 1177, 1453, 1582)

INFLUENCE OF BIOLOGICAL AGENTS

1509. COWIE, G. A. The mechanism of the decomposition of cyanamide in the soil. *Jour. Agric. Sci.* 10: 163-176. *Fig. 1-5.* 1920.—The decomposition of cyanamide in the soil has been attributed by certain workers to the action of bacteria. The author finds that his results coincide with those of ULPANI, who holds that cyanamide breaks down to urea by a purely chemical change. Sterile soils were capable of transforming cyanamide to urea but little or no ammonia was produced under such conditions. Urea is broken down to ammonia by a change which appears to be due to the action of soil organisms. Clay soils are more efficient in the breaking down of cyanamide to urea than are sandy soils. A sample of Thanet sand taken from borings through London clay was found capable of breaking down cyanamide even after ignition. This sand was found to have the power of softening water as have zeolites. Following this clue it was found that the effect of adding a definite zeolite, prehnite, to ordinary inert quartz sand was to produce a mixture capable of converting cyanamide to urea. Urea was found to accumulate in sterile soils when cyanamide was added.—V. H. Young.

1510. CRUMP, LETTICE M. Numbers of protozoa in certain Rothamstead soils. *Jour. Agric. Sci.* 10: 182-198. *20 fig.* 1920.—Methods are described for counting the protozoa of soil, which are adaptations of the methods commonly used for estimating soil bacteria. Two soils are dealt with in detail—a well manured arable soil and a soil which had had comparatively small applications of manure. Flagellates, amoebae, and thecamoebae are usually present in these soils in large numbers, and in the trophic condition are practically confined to the top 6 inches of soil. There is a definite inverse relation between the number of bacteria and amoebae. Variations in the water content and temperature of soils as well as the rainfall have no influence on soil amoebae. Soils rich in organic matter are richer in protozoa and especially in amoebae and thecamoebae. A bibliography of 23 citations is included.—V. H. Young.

1511. CUTLER, D. W. A method for estimating the number of active protozoa in the soil. *Jour. Agric. Sci.* 10: 135-143. 1920.—A method is described by which it is possible to estimate the numbers of active protozoa in a soil. The total number of protozoa is first found by a dilution method and a fresh portion of the soil is then treated with 2 per cent HCl (sp. gr. 1.15) overnight. By this means all active forms are killed. A second count by the dilution method gives the number of cystic protozoa in the soil.—V. H. Young.

1512. DAVIS, JOHN J. Miscellaneous soil insecticide tests. *Soil Sci.* 10: 61-75. *Pl. 1-2.* 1920.—In field experiments on the control of the commoner white grubs 1 gallon of 8-10 per cent kerosene emulsion per 6-8 square feet of soil washed in with water, slightly browned the tips of the grass. Sodium cyanide at the rate of 165 lbs. in 12,000 gallons of water per acre appreciably injured cultivated crops like corn but produced no permanent injury to grass. Sodium cyanide treatment was more effective in controlling white grubs than kerosene emulsion or coal tar products.—W. J. Robbins.

1513. KOMP, WILLIAM H. WOOD. The use of carbon bisulfide against the white grub. *Soil Sci.* 10: 15-28. 1920.—The maximum dosage of carbon bisulfide for ordinary lawn and golf-green grasses lies nearer 5 ounces than 1 ounce per square foot. The minimum dosage for the white grub is 1 ounce, and injections should be made about 6 inches apart and below the grubs. The soil should be medium moist to wet.—W. J. Robbins.

1514. MATTHEWS, DONALD J. The determination of ammonia in soil. *Jour. Agric. Sci.* 10: 72-85. 2 fig. 1920.—Various methods of determining ammonia in soils have resulted in figures that are too high due to the simultaneous decomposition of nitrogenous compounds. The author describes and figures "aeration apparatus" with which it is possible to recover large quantities of added ammonia with an accuracy of 98-99.5 per cent in 6 hours and with nearly equal accuracy in 3 hours. For most agricultural purposes an aeration of $1\frac{1}{2}$ hours is sufficient. Highly manured glass-house soils undergo partial decomposition in the cold with magnesia. In such cases a modification of the method is recommended. The complete recovery of added ammonia from a calcareous soil is difficult unless the soil is finely ground.—*V. H. Young.*

1515. PLYMEN, F. J., AND D. V. BAL. The biological aspects of wheat cultivation on embanked soils. *Agric. Jour. India* 15: 289-300. 1920.—Embanked wheat soils were said to be deteriorating giving low yields, and wheat plants grown on them were weak and yellow during the early stages of growth but recovered later. The soils are heavy and sticky, black in color, get very hard, and form tenacious blocks on drying after rains. They possess good powers for ammonification and nitrogen fixation but nitrification proceeds rather slowly. The retarding effect on young wheat plants may be due to lack of available nitrogen or to the presence of some deleterious substance formed under anaerobic conditions. Cultivation and aeration during the monsoon months removes the cause.—*F. M. Schertz.*

1516. PRESCOTT, JAMES ARTHUR. A note on the Sheraqi soils of Egypt. A study in partial sterilization. *Jour. Agric. Sci.* 10: 177-181. Fig. 1. 1920.—During the "sheraqi," or fallow period, in the region of the Nile, the soil becomes extremely dry and greatly cracked. The temperature is maintained at a point near 40°C . for some time. The author shows that this results in partial sterilization of the soil with a great decrease in the number of soil protozoa. Such soils when sampled and moistened up to 20 per cent showed greatly increased bacterial action over soils which were obtained before being subjected to the normal high temperatures and consequent partial sterilization. In partly sterilized soils there was a more rapid accumulation of available nitrogen parallel with that obtained following artificial soil sterilization.—*V. H. Young.*

1517. RUSSELL, E. J., AND E. H. RICHARDS. The washing out of nitrates by drainage water from uncropped and unmanured land. *Jour. Agric. Sci.* 10: 22-43. Fig. 1-6. 1920.—The results secured in a series of drain gauges at Rothamstead show that uncropped land persistently loses nitrogen in the form of nitrates but the rate at which the soil loses its power of producing nitrates from its own stock of nitrogenous compounds is relatively slow. At the beginning the first 9 inches of soil contained about 3500 lbs. of nitrogen per acre and yielded about 40 lbs. of nitrogen per acre to the drainage water. At the end of 50 years the soil still contains 2380 lbs. of nitrogen and is giving it up at the rate of 21 lbs. of nitric nitrogen per acre per annum. If the curve showing the rate of fall continued its present course and without further slowing down no less than 150 years would be needed for exhaustion of the nitrogen of the soil. The nitrogen lost from the soil appears in the drainage water wholly as nitrate. The authors find evidence from which they conclude that the subsoil contributes little if anything to the nitrogen content of the soil water. The analyses give no evidence of either the loss of gaseous nitrogen or of nitrogen fixation. The amount of nitric nitrogen in the drainage water is found to be closely related to the amount of rainfall. The months of greatest rainfall, in general October to January inclusive, are the months of greatest nitrate loss. During the last 25 years, 1 inch of water has washed out 1 lb. of nitrogen per acre, and for the 15 years previous to that the rate was 1.1 lb. Soil in situ does not give up its nitrogen as easily as when washed in ordinary laboratory experiments. A close relation between sunshine and soil temperature is revealed and it is found that a period of bright sunshine during the summer months results in an increase in nitrate loss during the succeeding rainy months. The amounts of nitrogen lost and the relation of rainfall, temperature, etc., to nitrate loss are shown in a number of graphs and tables giving the data obtained.—*V. H. Young.*

FERTILITY STUDIES

1518. ANONYMOUS. [Rev. of: NEWMAN, L. F., AND H. A. D. NEVILLE. A course of practical chemistry for agricultural students. Vol. I. 335 p. Cambridge University Press: 1920.] Sci. Prog. [London] 15: 321-322. 1920.

1519. BENNETT, HUGH H. The soils and agriculture of the Southern States. 15 X 20 cm., 399 p., 54 pl., 3 maps [1 colored]. The Macmillan Company: New York. 1921.—The important agricultural lands of the southern portion of the United States are described. The various soil types occurring are described and crops best suited for their growth discussed. The soil provinces are grouped into 1 the Atlantic and Gulf coastal plains, (2) the Piedmont plateau, 3, the Appalachian Mountain province, 4 the limestone valleys and uplands, 5 Mississippi bluffs and silt loam uplands, 6 the Great Plains region, (7) central prairie region, and 8 the stream bottom and second bottom soils. The fertilization of the various soil types for specific crops is discussed. In Appendix A the definition of a soil is given together with a classification of soil material by texture. In Appendix B tables are given showing the results of chemical analyses of some representative soils from widely separated localities in the Southern States. In Appendix C a list of publications on soils, soil physics, soil chemistry, soil management, crops, and livestock is given. In Appendix D statistics are given bearing on some of the important farm products of the Southern States.—J. J. Skinner.

1520. COMBER, NORMAN M. A qualitative test for sour soils. Jour. Agric. Sci. 10: 420-424. 1920.—A method is described whereby soils which are acid in nature and for which a lime requirement is indicated can be tested qualitatively. Solutions from such soils when treated with an alcoholic or ether-alcohol solution of potassium thiocyanate produce a coloration varying from an opaque red to pink, which indicates the formation of ferrie thiocyanate. This method was tested out on a comparatively large number of acid soils with the result just described.—V. H. Young.

1521. ELLETT, W. B., AND T. K. WOLFE. The relation of fertilizers to Hessian fly injury and winterkilling of wheat. Jour. Amer. Soc. Agron. 13: 12-14. 1921.—In Virginia when acid phosphate or manure is used, the Hessian fly injury is smaller and the yield greater than when manure is not used or when floats are applied in place of acid phosphate.—Fly injury ranges from 4.79 per cent in the manure-acid phosphate plot to 28.96 per cent in the buck-wheat-floats-lime plot. The manure plot suffered 10.64 per cent fly injury, which was next to the lowest. Manure has greatly prevented winter killings, as shown by yields. Results show that the element most needed to increase yields and decrease the amount of winter-killing is phosphorus. Practically all Virginia soils are deficient in phosphorus and that element must be supplied before material increases can be secured.—F. M. Schertz.

1522. HARTWELL, BURT L., AND S. C. DAMON. Six years experience in improving a light unproductive soil. Jour. Amer. Soc. Agron. 13: 37-41. 1921.—A Warwick sandy loam in Rhode Island was used. To increase productivity liming and fertilization with phosphate should be first considered. Legumes are beneficial for collecting nitrogen and increasing humus.—F. M. Schertz.

1523. JENKINS, E. H., AND W. L. SLATE, JR. Concerning the use of fertilizers. Connecticut [New Haven] Agric. Exp. Sta. and Storrs Agric. Exp. Sta. Joint Bull. 4. 5 p. 1921.—This paper gives some general principles that may govern the use of fertilizers. Special suggestions are given for the use and purchase of mixed fertilizers and chemicals together with suggestions for applications on mowings, potatoes, corn, tobacco, orchards, and gardens. Facts for calculating formulae are given. The publication is intended for general use.—Henry Dorsey.

1524. LIPMAN, C. B., AND G. A. LINHART. A critical study of fertilizer experiments Proc. Nation. Acad. Sci. 6: 684-686. 1920.—A preliminary report on a statistical study of the

results of fertilizer experiments at the Ohio and Pennsylvania agricultural experiment stations. Study of the Ohio data shows significant increases in yield on "two-element" and "three-element" plots, but not on "one-element" plots. The authors conclude that, even with the best methods, our present knowledge of the enormous variability of all soils and plants render the data from any given fertilizer plot of value only on that plot, and renders it highly probable that no fertilizer experiment as ordinarily conducted is possessed of sufficient practical value to justify the large expenditure of money, time, and energy involved.—Howard B. Frost.

1525. MAQUENNE, L., ET E. DEMOUSSY. Sur la richesse en cuivre de terres cultivees. [The amount of copper in cultivated soils.] Compt. Rend. Acad. Sci. Paris 169: 937-942. 1919.—The purpose of the work undertaken was to determine whether or not the copper introduced in soils by use of copper sprays may become injurious to plants. Samples (140) of vineyard and other soils were analyzed and the amount of copper was found to vary from less than 1 milligram per kilo to as much as 250 milligrams in some cases. The amount of calcium did not appear to have any direct bearing on the amount of copper retained by soils, but various soils were variable in their retaining power. In general, vineyard soils which had been subjected to copper sprays over a long series of years were found to contain the greatest amounts of copper. Most of this copper is retained in the first 0.3 meter of soil. Observations on the amount of copper taken up by plants and on the amount of soluble copper in the soil lead to the conclusion that the copper of cultivated soils is not injurious to plants.—V. H. Young.

1526. MASONI, G. La reazione alcalina provocata dagli acidi nelle terre in rapporto alla nutrizione delle piante. III. Solubilizzazione dei fosfati nel terreno. [The relation to plant nutrition of the alkaline reaction brought about by soil acids. III. Solubility of phosphates in the soil.] Staz. Sperim. Agrarie Ital. 53: 121-137. 1920.—A continuation of researches brought to bear on the question of the complex chemical reactions in the soil, the making soluble of substances insoluble in water, and plant chlorosis. Various mineral or organic acids were allowed to act upon the insoluble phosphates in the presence of an excess of CaCO_3 . The acids used were hydrochloric, nitric, sulphuric, formic, acetic, oxalic, succinic, malic, tartaric, and citric. The influence of the temperature upon the various changes was also studied and it was found that, especially when water was used alone, the solubility of $\text{Ca}_3(\text{PO}_4)_2$ was enhanced by a rise in temperature. The principal result of these investigations is to be found in the fact that in the presence of an excess of CaCO_3 the acids which left more phosphorus in solution were citric and malic, while the stronger acids left smaller quantities of this element in solution. These results are similar to those the author obtained when manganese and iron salts were used instead of calcium compounds. The behavior of the different acids the author ascribes to the OH ion developed, through their interaction with the calcium carbonate, and the influence of this upon the mono or dicalcium phosphate in solution and the resulting precipitation of the tricalcium salt. The presence of this OH ion is regulated by (a) the strength of the acid, and (b) the temperature at which the action takes place. It is concluded that the phenomenon of calcareous chlorosis affecting various species of plants grown on a calcareous soil, to a different degree, may be not only dependent upon a lack of iron but also of phosphorus.—A. Bonazzi.

1527. MOUNT, H. A. Fuel or fertilizer? Sci. Amer. 123: 498, 509-510. 3 fig. 1920.—A discussion of America's little-known peat bogs and their present utilization.—Chas. H. Otis.

1528. OPAZO, ROBERTO. Aplicacion de la cal a los terrenos de cultivo. [Application of lime to cultivated soils.] El Agricultor [Santiago, Chile] 5: 48-51. 1920.

1529. SEBELIEN, JOHN. Modern methods for experiments with fertilizers and manures. Jour. Agric. Sci. 10: 415-419. 1920.—The extreme variation between trial plots, amounting in some cases to as much as 100 per cent under the same treatment, leads to the conclusion that ordinary field plots are of little scientific value in studies with fertilizers and manures.

Pot experiments are of great value in accurate physiological experimentation but cannot be used to solve many problems connected with fertilizers. Various systems of arranging small plots and checks provide a method of compensating for the natural inequalities to be found in ordinary plots. Systems in vogue in a large number of experiment stations are described.—*V. H. Young.*

1530. STEWART, G. R., AND J. C. MARTIN. **Effect of various crops upon the water extract of a typical silty clay loam soil.** Jour. Agric. Res. 20: 663-667. 5 fig. 1921.—The effects of crops of maize, horse beans, potatoes, turnips, and barley upon the water extract of Yolo silty clay loam was studied. Each crop reduced the concentration of the aqueous extract. The nitrate content was reduced to a very low figure.—Concentration of soil solution is not reduced significantly until the portion of soil sampled is filled with roots.—*D. Reddick.*

1531. WALKER, SETH S. **Chemical composition of some Louisiana soils as to series and texture.** Louisiana Agric. Exp. Sta. Bull. 177. 27 p. 1920.—The chemical analysis of 67 soils and 64 subsoils, representing 27 soil types in the Long Leaf Pine Belt of Louisiana, is given together with a general discussion.—*C. W. Edgerton.*

PHYSICAL INVESTIGATIONS

1532. BOUYOUCOS, GEORGE. **Degree of temperature to which soils can be cooled without freezing.** Jour. Agric. Res. 20: 267-269. 1920 [1921].—Mineral soils may be supercooled to $-4.2^{\circ}\text{C}.$ without freezing; peats and mucks withstand $-5^{\circ}\text{C}.$; water, gelatin, agar, etc., may be supercooled to $-6^{\circ}\text{C}.$ No definite explanation of the phenomenon is offered but theoretical considerations are presented. "The ability of soils to resist freezing even when their temperature is much below the freezing point throws considerable new light on [biological] questions regarding the temperature of soils in cold seasons."—*D. Reddick.*

1533. COMBER, NORMAN M. **The flocculation of soils.** Jour. Agric. Sci. 10: 425-436. 1920.—This is a study of the effect of calcium salts in the flocculation of soils. Silt is most easily flocculated by calcium salts when the suspension is neutral. The addition of alkali renders the flocculation more difficult. Soil "clay" behaves in an opposite manner and is precipitated from alkaline suspensions more readily than from neutral ones. This behavior suggests that of "emulsoid" colloids and it is suggested that clay particles are protected by emulsoid colloids and so behave like them. If this is true, the action of lime is seen to be in accordance with the known facts of colloidal chemistry. Clay as an emulsoid is conceived to protect larger particles which are "suspensoid" in nature. Thus clay imposes its emulsoid nature on soil aggregates and thus on the whole soil. Fine silts are lacking in "emulsoid" clay to protect the larger "suspensoid" particles and are consequently not flocculated by calcium hydroxide.—*V. H. Young.*

1534. HOAGLAND, D. R., AND J. D. MARTIN. **Effect of season and crop growth on the physical state of the soil.** Jour. Agric. Res. 20: 397-404. 1920 [1921].—"The physical state of certain soil constituents is influenced to a marked degree by the concentration of the soil solution. The colloidal condition of the soil suspension undergoes significant alterations during the season. A large increase in colloidal matter is noted when the soil solution is depleted as a result of absorption of solutes by the plant."—*D. Reddick.*

1535. KEEN, BERNARD A. **The relations existing between the soil and its water content. A résumé of the subject.** Jour. Agric. Sci. 10: 44-71. 1 fig. 1920.—A review of the subject, with numerous citations, is presented. Emphasis is laid on the colloidal nature of soil and the necessity of attacking the problem of soil moisture from this point of view.—*V. H. Young.*

1536. MORETTINI, A. **Un decennio di ricerche sull'arrabbiaticcio.** [Ten years of study upon the subject of "arrabbiaticcio."] Staz. Sperim. Agrarie Ital. 53: 146-171. 1920.—The condition of the soil that receives in Italy the name of "arrabbiaticcio" and in France the name of "terre-gatee" has been known in Europe since the time of the Romans and was described

by Columella and Catone. It has been ascribed to the untimely cultivation of a soil, moist in the upper strata and dry in the lower, after a recent limited rainfall. The plants growing therein bear very few seeds and assume a rigid and starved appearance some time after the cultivation. The present author after long periods of study has not succeeded in reproducing the condition experimentally.—A. Bonazzi.

1537. OGG, WILLIAM GAMMIE, AND JAMES HENDRICK. *Studies of a Scottish drift soil. Part II.* Jour. Agric. Sci. 10: 333-342. 1920.—Part II of this series deals with the absorptive power of the soil and its mechanical fractions. The soil studied is a glacial drift soil from granitic rocks and is in a comparatively undecomposed state. It contains no carbonate of lime and has a comparatively small clay fraction; about 9 per cent of organic matter is present. This soil, known as "Craibstone" soil, has a considerable absorptive power for ammonia from a solution of sulphate of ammonia. The absorptive power per unit weight of the fractions increases with the decrease in size of the particles, reaching a maximum in clay. Fine silt and ordinary silt have a high absorptive power, probably partly due to organic matter. It appears probable that both the amount of surface exposed and the chemical nature of the soil are important in determining its absorptive power. The small amount of clay present indicates that much of the absorptive power is due to silt. [See following abstract.]-V. H. Young.

1538. OGG, WILLIAM GAMMIE, AND JAMES HENDRICK. *Studies of a Scottish drift soil. Part III.* Jour. Agric. Sci. 10: 343-357. 3 fig. 1920.—This section deals with the absorptive power of powdered granite and a comparison with "Craibstone" soil. It was shown that powdered granite has a considerable adsorptive power which compares favorably with that of "Craibstone" soil [see preceding entry]. Adsorption does not increase proportionately with the increase in area of finer fractions; it increases at a lower rate. The effect of ignition is to reduce the absorptive power and this effect is more marked with soil fractions. Absorbed ammonia is only gradually washed out by water and cannot be completely removed in this way. Adsorption by powdered granite and little-weathered soils appears to be principally a phenomenon of adsorption. [See preceding abstract.]-V. H. Young.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 769, 953, 957, 1085, 1212, 1446)

GENERAL

1539. BARNHART, JOHN HENDLEY. The so-called generic names of Ehrhart's *Phytolacium*. *Rhodora* 22: 180-182. 1920.—A criticism of the use of Ehrhart's so-called generic names, as such, by certain American authors. The present author shows by quotations from Ehrhart, and from OEDER who first originated the idea of such names, that these were first proposed as "nomina usualia" for non-botanical conversational use and "had no connection or relation to classification, to genus, or to specific relationship."—James P. Poole.

1540. BURKILL, I. H. Notes on Cola trees in the Economic Garden, Singapore. *Gardens' Bull. Straits Settlements* 2: 74-86. 1 fig. 1918.—The author gives a history of the Cola trees in the above Garden, where they were introduced in 1879, their growth and production. He adopts the nomenclature of CHEVALIER and PERROT as expounded by them in "Vegetaux utiles de l'Afrique tropicale française," VI, 1911. They claim that the *Sterculia acuminata* Beauv. of Benin is a small bushy tree 7 or 8 feet in height and does not produce the Kola Nut of Sierre Leone, which is the Kola of commerce, or but a very small part of it; that the tree which produces the larger part of the Kola Nut of Sierre Leone is 40 feet in height and is

Sterculia nitida Vent. The former produces Kola Nuts with 3 or more cotyledons and the latter those with only 2 cotyledons. Under the genus *Cola* these species are known respectively as *C. acuminata* (Beauv.) Schott & Endl. and *C. nitida* (Vent.) Schott & Endl. Three known varieties of the latter are given, namely, var. *alba*, var. *rubra*, and var. *mixta*. The fruit and seeds are illustrated and fully described. The active principles and chemical composition are given and also elaborate notes on the trade, cost of drugs and chemicals during the war, cultivation, yields, and properties.—*Oliver A. Farwell.*

1541. KOPS, JAN, F. W., VAN EEDEN, EN L. VUYCK. *Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen.* [Flora of Batavia. Illustrations and descriptions of the plants of Holland.] 402e-405e Aflevering. Pl. 2001-2016. Martinus Nijhoff: 's-Gravenhage, 1920.—The vascular plants illustrated and described in the present parts are: *Agrostis scabra* Willd., *Dipsacus laciniatus* L., *Lepidium bonariense* L., *Phalaris praemorsa* Lam. & DC., *Rubus procerus* P. J. Müll., *R. rubicundus* P. J. Müll. & Wirtg., *R. Wahlenbergii* Arrh., and *Rumex fennicus* Murbeck. The non-vascular plants included are: *Boletus felleus* Bull., *Cyphella capula* Holmsk., *Hygrophorus agathosmus* Fr., *Pleurotus mitis* P., *Polyporus leucomelos* P., *Russula fellea* Fr., *Sistotrema confluens* Fr., *Tricholoma Russula* Schaeff., and *Xylaris Guepini* (Fr.) Ces. [See Bot. Absts. 1, Entry 635; 5, Entry 2347; 7, Entry 1457; 8, Entry 1298.] —*J. M. Greenman.*

1542. [NORSTEDT, C. T. O.] [Swedish rev. of: BEAUVERD, G. *Monographie du genre Melampyrum.* (Monograph of the genus *Melampyrum.*) Mem. Soc. Phys. et Hist. Nat. Genève 38: 291-637. 31 fig. 1916-1917.] Bot. Notiser 1918: 159. 1918.

1543. [NORSTEDT, C. T. O.] [Swedish rev. of: LINDMAN, C. A. M. *Svensk Fanerogamflora.* (Swedish Phanerogam-flora.) 8 vo., viii + 639 p., 330 fig. 1918.] Bot. Notiser 1918: 306-308. 1918.

1544. OSTERHOUT, GEO. E. *Rocky Mountain botany and the Long expedition of 1820.* Bull. Torrey Bot. Club 47: 555-562. 1920.—An account is given of the work of Dr. E. P. JAMES of the Long Expedition with the itinerary of the expedition and a list of the new species collected.—*P. A. Munz.*

1545. VUYCK, L., EN H. C. VAN DE PAVORD SMITS. *Naamlijst der Nederlandsche Gewassen afgebeeld en beschreven in deel I-XXV der Flora Batava.* [Index of the plants of Holland illustrated and described in parts I-XXV of the Flora of Batavia.] 12 × 19 cm., 131 p. Martinus Nijhoff: 's-Gravenhage, 1920.—This index is an alphabetical list of the scientific and common names of the plants included in the first 25 parts of the "Flora Batava."—*J. M. Greenman.*

PTERIDOPHYTES

1546. MOXLEY, G. L. Notes, chiefly nomenclatorial, on southern California ferns. Bull. Southern California Acad. Sci. 19: 56-57. 1920.—Two new combinations of ferns, *Thelypteris normalis* (C. Chr.) Moxley and *Thelypteris arguta* (Kaulf.) Moxley, are given.—*Roxana Stinchfield Ferris.*

SPERMATOPHYTES

1547. ANONYMOUS. *Poa omeiensis.* Jour. Botany 58: 295. 1920.—*Poa omeiensis* Rendle (Jour. Botany 58: 25, 1920) is an abortive name, hence should be replaced by *P. szechuensis* Rendle.—*K. M. Wiegand.*

1548. ANONYMOUS. The name *Alsine.* [Rev. of: SPRAGUE, T. A. *Stellularia* or *Alsine.* Bull. Misc. Inf. Kew 1920: 308-318. 1920.] Jour. Botany 58: 294. 1920.

1549. ASHE, W. W. Notes on trees and shrubs of eastern North America. Bull. Torrey Bot. Club 47: 581-582. 1920.—*Prunus allegheniensis* Porter is shown to extend as far south

in distribution as Virginia and West Virginia; a shrubby form of *Azalea arborescens* Pursh is discussed, which grows at Great Falls, Virginia; and *Azalea neglecta* sp. nov. is described.—P. A. Munz.

1550. BREWSTER, A. A. **Flowers of Haemodorum, blood root.** Australian Nat. 4: 152. 1920.—A semi-popular note on the form and number of the floral parts. The flower opens to a very limited extent, but pollination by "honey lovers" is inferred from the nectararies. Size and color are referred to only as "this seemingly insignificant 'black' flower." If black, it is striking.—T. C. Frye.

1551. DAVIDSON, A. **New or noteworthy additions to the flora of southern California.** Bull. Southern California Acad. Sci. 19: 54–56. 1920.—With distributional notes of various flowering plants there is a description of a new species, *Allium montigenum* Davidson.—*Rorana Stinchfield Ferris.*

1552. FERNALD, M. L. **Rubus recurvicaulis** Blanchard, var. *armatus* n. var. *Rhodora* 22: 168. 1920.—This new variety strongly simulates *R. tardatus* Blanchard, in its bristly inflorescence, but has the leaflets broader and rounded at the base as in typical *R. recurvicaulis* which occurs with the variety, and to which it intergrades. Specimens have been collected in Newfoundland, Miquelon, and Cape Breton.—James P. Poole.

1553. FERNALD, M. L., AND K. M. WIEGAND. **Studies of some boreal American Cerasti-ums of the section Orthodon.** *Rhodora* 22: 169–179. 1920.—Pursuant to their studies of Newfoundland and Labrador collections of *Cerastium*, the authors here publish the result of their investigations of the American species of the section *Orthodon*, the plants of which have passed in America under the composite species *C. alpinum* L., *C. vulgatum* L., and *C. arvense* L. They recognize the following species, varieties, and forms: *C. alpinum* L., *C. alpinum* var. *legitimum* Lindblom, *C. alpinum* forma *pulvinata* Simmons, *C. alpinum* var. *glanduliferum* Koch., *C. alpinum* var. *glutinoso-lanatum* Facchini., *C. alpinum* var. *lanatum* (Lam.) Hegetschw., *C. Beerlingianum* Cham. & Schlecht., *C. Beerlingianum* var. *capillare* n. var., *C. Fischerianum* Seringe, *C. arcticum* Lange, *C. Earlei* Rydberg, *C. terrae-novae* n. sp., *C. terrae-novae* forma *Waghornei* n. f., *C. unalaschkense* Takeda, *C. vulgatum* L., *C. vulgatum* var. *hirsutum* Fries., and *C. arvense* L. Bibliography and synonymy are given except for the last species. In this case the authors state that all their attempts to reduce the species-complex to definite species or varieties with natural ranges have proved futile.—James P. Poole.

1554. GODFREY, M. J. **The problem of the British marsh orchids.** Jour. Botany 58: 286–290. 1920.—*Orchis latifolia* was studied at Venice, Alpes Maritimes, France, last May where *O. maculata* was entirely absent. Instead of a large proportion of plants with unspotted leaves and a wide variation in the markings of the lip very little of either peculiarity was found. The spots were almost always present, and were either ringed or solid. The author is convinced that *O. latifolia* of this region is identical with the spotted-leaved marsh orchis of Great Britain. *O. latifolia* in Venice is certainly not a hybrid of some species with *O. maculata*, which is absent. The suggestion that *O. praetermissa* Druce is the true *O. latifolia* has no foundation. The spotted leaved British marsh orchis is probably simply *O. latifolia*, and not a hybrid. Confusion has arisen through the erroneous identification of hybrids as *O. latifolia*. With the recognition of *O. latifolia* as a species the problem of the British marsh orchis is much simplified. The question as to whether there are unspotted forms of *O. latifolia* distinct from *O. praetermissa* remains unsolved.—K. M. Wiegand.

1555. HEMSLEY, W. B. [Rev. of: MAIDEN, J. H. **A critical revision of the genus Eucalyptus.** Vol. 2, parts 8–10; Vol. 3, parts 1–8; Vol. 4, parts 1, 3, 5–10 (parts 18–28, 31, 33, 35–40 of the complete work). W. A. Gullick: Sydney, 1913–1920.] Nature 106: 45. 1920.—See Bot. Absts. 1, Entry 806; 2, Entry 1355; 3, Entries 1308, 2995; 7, Entry 1464.

1556. HERVEY, E. WILLIAMS. A rare variety of *Vitis labrusca*. *Rhodora* 22: 183-184. 1920.—Report of a white variety of *V. labrusca* found on sale in the New Bedford market and traced to a vine growing in the woods near the town of Rochester, Massachusetts. Report of the same variety in the woods in Westport. Editor's note refers this grape to the "White Fox," *V. labrusca* var. *alba*, found wild in the woods at York, Pennsylvania.—James P. Poole.

1557. JANSEN, P., EN W. H. WACHTER. Floristische aantekeningen xvi. *Glyceria*, R. Br. [Floristical notes xvi. *Glyceria* R. Br.] *Nederland. Kruidk. Arch.* 1919: 317-325. 1919.—The occurrence and description of species, varieties, and hybrids of the genus *Glyceria* in the Netherlands are given.—J. C. Th. Uphof.

1558. JENNINGS, O. E. New or noteworthy plants from northwestern Ontario. *Jour. Washington [D. C.] Acad. Sci.* 10: 453-460. 1920.—From collections made by the author and Mrs. O. E. JENNINGS in Ontario to the north and northwest of Lake Superior the following new species and varieties are described: *Lysias orbiculata* (Pursh) Rydb. var. *pauciflora*, *Kneiffia depauperata*, *Pyrola uliginosa* Torr. var. *gracilis*, *P. compacta*, *P. chlorantha* Sw. var. *revoluta*, *Scutellaria lateriflora* L. var. *axillaris*, *Stachys palustris* L. var. *puberula*, *S. palustris* L. var. *macrocalyx*, *S. palustris* L. var. *nipigonensis*.—E. B. Payson.

1559. LEWTON, F. L. The history of kidney cotton. *Jour. Washington [D. C.] Acad. Sci.* 10: 591-597. 2 fig. 1920.—An account of its nomenclature. The name *Gossypium lapideum* Tussac, published in 1818, is accepted.—Helen M. Gilkey.

1560. MACCAUGHEY, VAUGHAN. The Mangrove. *Amer. Bot.* 25: 42. 1919.—*Rhizophora Mangle* L. is not native to the Hawaiian Islands but has been introduced near Honolulu where it has increased, suggesting that it would be a desirable species for planting on the coast. The species is also described and its uses given.—W. N. Clute.

1561. MACKENZIE, KENNETH K. Scientific names applicable to our purple-flowered Eupatoriums. *Rhodora* 22: 157-165. 1920.—In referring to K. M. WIEGAND's article "Eupatorium purpureum and its allies" (*Rhodora* 22: 57), the author is in accord with the latter's conclusions that there are 4 distinct and well-marked species in this group but is not in agreement with him when it comes to applying names occurring in botanical literature to the various species recognized. The present author gives the 4 species numbers in the same way as done by Wiegand and discusses at some length the problem of the identity of each.—James P. Poole.

1562. MOXLEY, GEORGE L. *Zauschneria orbiculata* n. sp. *Bull. Southern California Acad. Sci.* 19: 30. 1920.

1563. NAKAI, TAKENOSHIN. Notulae ad plantas Japoniae et Coreae XX. [Notes on the plants of Japan and Corea. XX.] *Bot. Mag. Tôkyô* 33: 41-61. 1919.—Besides brief miscellaneous notes the following new species and varieties are described and new combinations made: *Carex daisenensis*, *Salix meta-formosa*, *S. orthostemma*, *S. sericeo-cinerea*, *S. sericeo-cinerea* var. *lanata*, *Alnus borealis* Koidzumi var. *koreana* (*A. japonica* Siebold & Zucc. var. *koreana* Callier), *A. borealis* Koidzumi var. *latifolia* (*A. japonica* Siebold & Zucc. var. *latifolia* Callier), *A. borealis* Koidzumi var. *paniculata* (*A. paniculata* Nakai), *A. japonica* Siebold & Zucc. var. *rufa*, *A. vermicularis*, *Betula Schmidtii* Regel var. *lancea*, *Parietaria coreana*, *Polygonatum lyratum*, *Rheum coreanum*, *Melandrium umbellatum*, *Clematis subtritermata*, *C. subtritermata* var. *tenuifolia*, *C. ochotensis* Poirer var. *ternata*, *Isopyrum insigne*, *Pulsatilla nivalis*, *Thalictrum osmorhizoides*, *T. spirostigma*, *C. Maximowicziana* (*C. speciosa* Maxim.), *Arabis ligulifolia*, *Barbarea sibirica* (*B. vulgaris* R. Br. var. *sibirica* Regel), *B. hondoensis*, *Cotyledon filifera*, *Astilbe chinensis* (Maxim.) Franch. & Savat. var. *formosa*, *A. chinensis* (Maxim.) Franch. & Savat. var. *paniculata*, *A. hachijoensis*, *Spiraea pseudo-crenata*, *Sorbus amurensis* Koehne var. *rufa*, *Potentilla chinensis* Seringe var. *littoralis*, *P. chinensis* Seringe

var. *pseudo-chinensis*, *Astragalus setsureianus*, *Phellodendron molle*, *Acer palmatum* Thunb. var. *pilosum*, *A. pictum* Thunb. var. *horizontale*, *Tilia amurensis* Komarov var. *rufa*, *T. amurensis* Komarov var. *koreana*.—E. B. Payson.

1564. OMANG, S. O. F. *Hieracium*-Sippen der Gruppe Alpina aus dem südlichen Norwegen. III. [*Hieracium* forms of the group Alpina in southern Norway.] *Nyt Mag. Naturvidenskaberne* 56: 69-106. 1919.—Studies of *Hieracium* during July-August 1913 in mountain districts has resulted in the publication of the following new species: *H. applicans*, *H. callianthum*, *H. dissotocum*, *H. excretum*, *H. eucalpideum*, *H. euphyllotum*, *H. helinense*, *H. limatum*, *H. lomochnoum*, *H. monacroides*, *H. mutilescens*, *H. nannocephaloides*, *H. nannocephalum*, *H. odontolipes*, *H. paramecodes*, *H. paramorphum*, *H. sculetum*, *H. sordidiceps*, *H. tanycladum*, *H. tenellecens*, and *H. tenuiceps*.—A. Gundersen.

1565. PARKER, R. N. *Erythrina glabrescens* sp. nova. *Indian Forester* 46: 647-648. 1920.—A new tree reaching a height of 50-60 feet and a girth of 5-6 feet is described from India.—E. N. Munns.

1566. PFEIFFER, H. *Ficiniae speciebus novis aucta*. [New species of *Ficina*.] *Herbarium* 54: 33-34. 1920.—New species and varieties of *Ficina*, mostly from South Africa, are described as follows: *Ficina atrostachya*, *F. dasystachya* C. B. Clarke var. *Burchellii*, *F. Schlechteriana*, *F. thyrsoidea*, *F. canaliculata*, *F. decidua*, *F. Trinkleriana*.—H. A. Gleason.

1567. PIER, C. V. A new genus of Leguminosae. *Jour. Washington [D. C.] Acad. Sci.* 10: 432-435. 1920.—*Monoplegma* is proposed as a new genus to which is referred one species, *M. sphaerospermum*, from Costa Rica. Superficially this plant resembles species of *Canavalia* but floral characters indicate that its relationship is much closer to *Dolichos*.—Helen M. Gilkey.

1568. PUGSLEY, H. W. Notes on the British hawkweeds. *Jour. Botany* 58: 281-285. 1920.—The notes were compiled in connection with an attempt to work out the British hawkweeds, *Hieracium*, of which during the past 25 years 250 gatherings have been made. A brief historical sketch of the study of this genus in Britain is given. Fourteen species are listed with accompanying notes on distribution, specific validity, and nomenclature. *Hieracium holophyllum* Linton *β. angustisquamum* is described as new.—K. M. Wiegand.

1569. RUSBY, H. H. Descriptions of three hundred new species of South American plants with an index to previously published South American species by the same author. 8 vo., 170 p. Published by the author: New York, December 20, 1920.—The following species of flowering plants, mostly from Colombia and Bolivia, are described as new to science: *Xanthosma bilineata*, *Tillandsia triangularis*, *T. attenuata*, *T. marantoidea*, *Dioscorea recurva*, *D. frutescens*, *D. truncata*, *D. Herbert-Smithii*, *D. hastatissima*, *Renealmia orinocensis*, *Myrica costata*, *Pouzolzia platyphylla*, *P. petiolata*, *Boehmeria sordida*, *Pilea macrophylla*, *Sahagunia colombiana*, *Myriocarpa magnifica*, *M. obscura*, *Roupala discolor*, *Struthanthus divaricatus*, *Aetanthus ovalis*, *Dendrophthora stricta*, *D. striata*, *Agonandra granatensis*, *Apodanthes tribracteata*, *Allionia craterimorpha*, *Berberis ovalifolia*, *B. densifolia*, *Cissampela tomentocarpa*, *Hyperbaena trinervis*, *Duguetia pauciflora*, *D. rostrata*, *Trigynaeia anastomosans*, *Oxandra ovata*, *Nectandra amplifolia*, *Ocotea flavescens*, *O. flexuosa*, *O. alloiophylla*, *Sparattanthelium Sprucei*, *Lepidium angustifolium*, *Radicula scabra*, *Morisonia elliptica*, *Elaeodendron macrophyllum*, *Brunellia boliviana*, *B. Brittonii*, *Weinmannia lyrata*, *Licania venosa*, *Parinarium pachyphyllum*, *Moquilea cuspidata*, *M. orinocensis*, *Rourea laxiflora*, *Tourneate costata*, *Lotoxalis phaseolifolia*, *L. manihotoides*, *Xanthoxalis unduavensis*, *X. flagellata*, *X. mollissima*, *X. biflexa*, *Ionoxalis pazensis*, *I. Buchtienii*, *Erythroxylon densum*, *E. uniflorum*, *Picramnia villosa*, *Protium mucronatum*, *P. orinocense*, *Cedrela boliviana*, *Trichilia oblanceolata*, *Byrsonima Herbert-Smithii*, *Pterandra opulifolia*, *Heteropteris rhombifolia*, *Tetrapteris alloi-carpha*, *T. tenuistachys*, *Securidaca orinocensis*, *S. venosa*, *Monnina Buchtienii*, *Phyllanthus heteromorpha*, *Croton bondaensis*, *C. cienagensis*, *C. obtusus*, *C. ochromaeifolius*, *Acalypha*

salicioides, *A. amplifolia*, *A. Williamsii*, *A. subscandens*, *A. jubifera*, *A. asterifolia*, *Pera benensis*, *Chaetocarpus Pearcei*, *Sebastiania boliviana*, *Euphorbia sanmartensis*, *E. chiogenoides*, *E. subtrifoliata*, *Ilex imbricata*, *Salacea sphaerocarpa*, *S. mucronata*, *S. catalinensis*, *Hippocratea foliosa*, *Rhamnus atroviridis*, *Gaya rubricaulis*, *Malvastrum micranthum*, *Ayenia acuminata*, *Sterculia laxiflora*, *Saurauja brevipes*, *S. Herbert-Smithii*, *Clusia oblanceolata*, *C. ternstroemioides*, *Vismia falcata*, *V. angustifolia*, *Calceolaria hirsuta*, *C. curvirostra*, *Rinorea dichotoma*, *Hasseltia lateriflora*, *Casearia onacaensis*, *C. chlorophoroidea*, *C. Herbert-Smithii*, *Begonia unduavensis*, *B. lignosa*, *B. oblanceolata*, *B. heterodonta*, *B. subcostata*, *Grislea compacta*, *Ammania pedunculata*, *Combretum latipaniculatum*, *C. multidiscum*, *C. oblongifolium*, *Maieta robusta*, *Hartmannia boliviana*, *Pentapanax granatensis*, *Hydrocotyle grossulariaefolia*, *Gaultheria sanmartensis*, *G. tetriches*, *G. Fendleri*, *Macleania robusta*, *M. arcuata*, *M. recurva*, *Sophoclesia robusta*, *Vacciniopsis tetramera*, *Psammisia elegans*, *Cybianthus foliosus*, *Icacorea granatensis*, *I. Herbert-Smithii*, *I. sanmartensis*, *Symplocos mapirensis*, *Buddleia cochabambensis*, *Spigelia filipes*, *Aspidosperma elliptica*, *Tabernaemontana longiflora*, *T. albescens*, *T. cuspidata*, *T. myriantha* Britton, *Rauwolfia littoralis*, *Echites Sanctae-Martae*, *E. Laurentiae-disca*, *E. bicorniculata*, *Dipladenia alba-viridis*, *D. Buchtienii*, *D. piladenia*, *D. tetradenia*, *D. glabra*, *Odontadenia cuspidata* (*Dipladenia cuspidata* Rusby), *Mandevilla attenuata*, *Forsteronia foliosa*, *Prestonia mucronata*, *P. robusta*, *P. gracilis*, *Hemipogon andinum*, *H. Williamsii*, *Irmischia angustifolia*, *I. aristata*, *Philibertia filipes*, *P. ovalifolia*, *Stenomeria tomentosa*, *Metastelma atrovirens*, *M. pallidum*, *M. ovatum*, *Tassadia recurva*, *Ditassa Mandoni*, *Schistogyne pentaseta*, *Amphistelma leptocarpa*, *Vincetoxicum acutissimum*, *Marsdenia ecorpuscula*, *M. inelegans*, *M. asclepioidea*, *Phaeostemma grandifolia*, *Gonolobus Squiresii*, *G. attenuatus*, *G. leucodermis*, *Maripa acuminata*, *M. repens*, *Ipomoea hilarifolia*, *Cordia carnosa*, *C. opaca*, *C. subtruncata*, *Bourreia viridis*, *Tournefortia macrostachya*, *Coldenia aggregata*, *C. elongata*, *Aegiphila stricta*, *Lippia subterranea*, *Salvia tenuistachya*, *S. viridifolia*, *S. libanensis*, *S. multispicata*, *S. secundiflora*, *Solanum tetrapetalum*, *S. penduliflorum*, *S. scorpioideum*, *S. auctosepalum*, *S. sacupanense*, *S. deltoideum*, *Cyphomandra chlorantha*, *C. bassovioidea*, *Bassovia calceolarioides*, *B. ferruginea*, *Physalis petiolaris*, *P. cuneata*, *P. margaranthoides*, *Cestrum imbricatum*, *C. papyraceum*, *Cuspidaria ovalis*, *Adenocalymna purpurascens*, *A. latifolia*, *A. symmetrica*, *Besleria debilis*, *B. tenuifolia*, *Gesneria onacaensis*, *Diastema Williamsii*, *Phinaea albiflora*, *Columnnea stricta*, *C. pallida*, *C. grandifolia*, *C. latifolia*, *C. sanmartensis*, *Beloperone sanmartensis*, *Jacobinea Lindaviana*, *Rondeletia colombiana*, *R. ovata*, *Elaeagia obovata*, *E. mollis*, *Lygistum tomentosum*, *Gonzalagunia acutifolia*, *Posoqueria platysiphonia*, *Randia orinocensis*, *Duroia Sprucei*, *Alibertia granulosa*, *Hoffmannia striata*, *H. viridis*, *Guettarda discolor*, *G. roupalaefolia*, *Mapourea biacuminata*, *M. latifolia*, *Psychotria scabrifolia*, *P. albocostata*, *P. olyphylla*, *P. sanmartensis*, *P. indulgens*, *P. salicifolia*, *Palicourea populifolia*, *P. abbreviata*, *P. caloneura*, *P. Williamsii*, *Rudgea longirostris*, *Coussarea grandifolia*, *Borreria Herbert-Smithii*, *Siphocampylus rectiflorus*, *S. declinatus*, *Centropogon foliosum*, *Piptocarpha gracilis*, *Addisonia boliviana*, *Kanimia colombiana*, *Baccharis condensata*, *B. densifolia*, *Gnaphalium multicapitatum*, *Clibadium latifolium*, *C. lanceolatum*, *Baltimora ovata*, *Montanoa serrata*, *Wedelia heterophylla*, *W. symmetrica*, *Melanthera longipes*, *Encelia soratensis*, *E. deltoidea*, *Calea congesta*, *C. Herbert-Smithii*, *C. Holtoni*, *Pectis rosea*, *P. densa*, *Liabum biattenuatum*, *L. subumbellatum*, *L. stipulatum*, *L. falcatum*, *L. acuminatum*, *Moquinia macrocephala*, *Lycoseris oblongifolia*, *Onoseris alata*, and *Jungia grossulariaefolia*.—J. M. Greenman.

1570. SMALL, JOHN K. *Urechites pinetorum*. *Addisonia* 4:21-22. Pl. 131 (colored). 1919.—The author gives a full description of this proposed new species of the family Apocynaceae, an inhabitant of the pine woods of the Everglade Keys of Florida, and includes notes on the related and long known species, *U. lutea* (L.) Britt., a vine, sometimes climbing to the top of tall trees, an inhabitant of the hammocks. The stem of the proposed species is erect.—T. J. Fitzpatrick.

1571. SMITH, CHARLES PIPER. *Studies in the genus Lupinus*—V. The *Sparsiflori*. *Bull. Torrey Bot. Club* 47: 487-509. Fig. 53-56. 1920.—Keys to, and diagnoses of, the following species and varieties of *Lupinus* are given: *L. hirsutissimus* Benth., *L. sparsiflorus* Benth.

and its varieties *arizonicus* (Wats.) comb. nov., *setosissimus* var. nov., *barbatulus* Thorneb. var. nov., *insignitus* var. nov., *inopinatus* var. nov., *Pondii* (Greene) comb. nov.; *L. truncatus* Nutt. and its variety *Burlewii* var. nov.; *L. Benthani* Heller and its variety *opimus* var. nov.; *L. citrinus* Kellogg; and *L. deflexus* Congdon.—P. A. Munz.

1572. STANDLEY, PAUL C. The North American species of *Agonandra*. Jour. Washington [D. C.] Acad. Sci. 10: 505–508. 1920.—Two new species, *A. obtusifolia* and *A. Conzattii*, are described and *A. racemosa* (*Schaefferia racemosa* DC.) appears as a new combination, all from Mexico. This is the first time that the genus has been reported from North America, and this is the only genus of the family Opiliaceae known on the western continent.—Helen M. Gilkey.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

1573. ANONYMOUS. Artificial wool from cotton waste. Sci. Amer. 123: 569. 1920.

1574. DOFLEIN, FRANZ. Das Problem des Todes und der Unsterblichkeit bei den Pflanzen und Tieren. [Death and immortality in plants and animals.] 119 p. G. Fischer: Jena, 1919.

1575. FONTANEL, P. Séchage des plantes pour herbiers. [The drying of plants for herbaria.] Nat. Canadien 47: 51–61. 1920.—The author notes the common and the complicated processes of drying plants and proposes an intermediate process depending first on drying under the usual pressure of absorbent layers but at a higher temperature, to accelerate the evaporation of moisture and forestall the degenerative action of enzymes and bacteria. This requires a current of heated air, the temperature being first between 60 and 70°C. Later the temperature should be considerably lowered. A box holds the plants over a suitable source of heat. Between the specimen sheets are sheets of tubed cardboard through which the upward current of warm air passes. Methods for treating certain plants with chemicals, to preserve color, elasticity, etc., and to prevent decomposition, are also considered.—A. H. MacKay.

1576. JORDAN, W. H. Director's report for 1919. New York Agric. Exp. Sta. [Geneva] Bull. 470. 28 p. 1919.—A discussion of administrative matters and of the research work of the station in 1919. A list of the publications issued by the station during 1918 and 1919 is appended.—F. C. Stewart.

1577. MOUNT, H. A. Our coal in the making. Sci. Amer. 123: 522, 532, 534–535. 4 fig. 1920.—A popular article on peat.—Chas. H. Otis.

1578. NEWTON, R. The quality of silage produced in barrels. Jour. Amer. Soc. Agron. 13: 1–11. 1921.—Judging by the odor, appearance, palatability, and chemical tests, barrels were found to be suitable experimental containers for silage. Silage from barrels was found to compare favorably with silage from farm silos.—F. M. Schertz.

1579. PATHAK, G. P. Some famine foods in Ahmedabad. Agric. Jour. India 15: 40–45. 1920.—New materials which have been utilized as famine food are Bid (rhizomes of *Scirpus kysoor*), Thek (rhizomes of *Cyperus bulbosus*), Poli of pan (the inflorescence of *Typha angustata*), and tubers and fruits of poyana (*Nymphaea stillata*). Bid contains about 70 per cent of digestible carbohydrates and 8–10 per cent of proteids. When used for human food the clods dug from the soil containing the rhizomes are left unbroken until thoroughly dried. The thek plant grows naturally in salt land; when properly dried and roasted it is used for flour. Poyana is the common water lily of the nal. The tubers are roasted in ashes or are

boiled. The seeds are used for flour. The dried tubers contain about 68 per cent of digestible carbohydrates and 15 per cent of proteids; the seed, 70 per cent of carbohydrates and 11 per cent of proteids.—*J. J. Skinner.*

1580. SCHNEGG, H. **Die Pilze und ihre volkswirtschaftliche Bedeutung.** [Fungi and their domestic significance.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 49: 90-91. 1919.—A synopsis of a lecture on the utilization of mushrooms is here given. Their importance as food for man and domestic animals is emphasized, and their employment in powdered form is especially recommended. It is further suggested that woody shelf-fungi be used as a substitute for cork and kindling wood.—*A. W. Evans.*

1581. SCHÜRHOFF, H. **Die Verwertung der Brennesseln als Gespinnstfasern.** [The utilization of nettle-fibers in spinning.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 49: 73. 1919.—In this report of a lecture on nettle-fibers, the utilization on a commercial basis is described, and the hope is expressed that these fibers may partially take the place of cotton in Germany.—*A. W. Evans.*

1582. VON STIETZ, G. E. C. **Molasses as fuel, and the manufacture of potash from the ashes.** Louisiana Planter and Sugar Manufacturer 64: 348-350. 1920.—Molasses can be burned in combination with other fuels. The ashes have a very high content of potassium salts. Methods of extracting and refining the ashes are given.—*C. W. Edgerton.*

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Vol. VIII

JULY, 1921

No. 3

ENTRIES 1583-2267

AGRONOMY

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1583. ANONYMOUS. Springside crop-growing competition. Agric. Gaz. New South Wales 32: 86-87. 1921.—Results are given by 6 farmers in crop growing for prizes. Varieties, methods of cultivation, amounts of seed and manure, and other data are tabulated.—*L. R. Waldron.*

1584. ANONYMOUS. The trend of research work in the agricultural utilization of peat land. Jour. Amer. Peat Soc. 14: 64-66. 1921.—Most of the undrained peat land in the United States is strongly acidic. Raw peat soils are suited to the culture of millet, buckwheat, redtop, oats, corn, rye, potato, the blueberry, and the cranberry. When treated with potash salts and lime they are neutralized and should yield good crops of red clover, wheat, and rutabagas. The successful cultivation of peat lands is dependent on the recognition of differences of acidity and alkalinity and the appropriate adaptation of crops.—*G. B. Rigg.*

1585. ANONYMOUS. Verslagen der Rijkslandbouw proefstations voor Contrôle-Onderzoek. [Reports of the Government Agricultural Control Stations.] Verslag. en Mededeel. Directie Landb. [Nederland] 1919: 1-103. 1919.—A report is given of the activities of the Control Agricultural Stations at Wageningen, Goes, and Maastricht on examinations of fertilizers, seed samples, etc.—*J. C. Th. Uphof.*

1586. ANONYMOUS. Verslagen der Rijkslandbouw proefstations voor Contrôle-Onderzoek. [Reports of the Government Agricultural Control Stations.] Verslag. en Mededeel. Directie Landb. [Nederland] 1920: 1-80. 1920.—A report of the activities of the Control Agricultural Stations at Wageningen, Goes, and Maastricht on examinations of fertilizers, seed samples, etc.—*J. C. Th. Uphof.*

1587. ANONYMOUS. [Rev. of: BRENCHEY, W. E. Weeds of farm land. x + 329 p. *Illus.* Longmans, Green & Co.: London, 1920.] Sci. Prog. [London] 15: 500-501. 1921.

1588. ANONYMOUS. Habit in sugar canes. [Rev. of: RAO, N. VITAL. Habit in sugar canes. Agric. Jour. India 15: 418-424. 1920. (Paper read at the 7th Indian Science Congress, Nagpur, 1920.) (See Bot. Absts. 7, Entry 1569.)] Internat. Sugar Jour. 23: 109. 1921.

1589. ANNETT, HAROLD EDWARD. Factors influencing alkaloidal content and yield of latex in the opium poppy (*Papaver somniferum*). *Biochem. Jour.* 14: 618-636. 1920.—The following points are discussed by the writer: (a) Alkaloidal content and yield of latex from each of a series of successive lancements of the same capsule; (b) variation in rate of flow and morphine content of latex at different periods of time after incision; (c) effects of different systems of lancing on yield and composition of latex; (d) yield and alkaloidal content of latex from different capsules on the same plant; (e) relation between stage of development of capsule and yield, and alkaloidal content of latex; (f) effects of climate and weather conditions; (g) influence of manures; (h) influence of starvation; and (i) influence of heredity.—A. R. Davis.

1590. B[ARBER], C. A. On the viability of sugar cane pollen. *Internat. Sugar. Jour.* 23: 71-72. 1921.—T. S. VENKATARAMAN of the Coimbatore Cane-breeding Station in south India reports success in germinating sugar cane pollen. The stigmas of *Datura fastuosa* var. *alba* and *Hibiscus vitifolia* germinated cane pollen satisfactorily. Working with this test it was found that cane pollen usually lost its viability in less than an hour, varying slightly with the variety of cane. By protecting a cane plant with its arrows, the pollen sacs were prevented from bursting. In this way pollen was kept viable for 6-14 days.—C. Rumbold.

1591. BESEMFELDER, R. Der Zuckerrübenbau der Zukunft. [The sugar beet culture of the future.] *Mitteil. Deutsch. Landw. Ges.* 35: 401-406. 1920.—A general review of the factors affecting the growth of the sugar beet industry.—A. J. Pieters.

1592. BOUSSET, HERMANN. Das Schilfrohr als Wirtschaftspflanze und das Siedlungsproblem. [Phragmites as an economic plant and the settlement problem.] *Mitteil. Deutsch. Landw. Ges.* 35: 411-413. 1920.—There are 200,000 hectares of low land on sea and river in Germany covered with *Phragmites*. The growth tends to encroach on the water and obstruct navigation. To combat this, machines have been constructed with clam shell buckets to dredge out the mass of rootstocks. It is said that the rootstocks contain 52 per cent extractives, of which 30 per cent is sugar. The rootstocks have been used to prepare alcohol, 100 kg. of air dry material yielding 11 liters of 100 per cent alcohol. A heavy beer, resembling porter, has also been brewed, and from some parts of the rootstocks a cocoa-like drink called "Branca" can be made. A feed for cattle called "Fragruit" is also produced and is said to have a high feeding and digestive value.—A. J. Pieters.

1593. DAWE, M. T. Colombian pita fibre.—Part I. *Tropic. Life* 16: 182-183. 1920.—The Pita plant, *Ananas* sp. is found in Colombia and adjacent South and Central American republics. It has been known as *Ananas macrodontes* but a recent examination of material at the Kew Gardens "proves the Colombian plant to be quite distinct from this species." A single plant 10 feet or more in length and 4 inches broad in the middle bears from 20 to 40 leaves, and produces a pineapple-like fruit. Propagation is usually by rootstocks; the plant makes its best growth in the shade. The Chiriguana forest of Colombia is famed for its "pitales." It does best on a light sandy, well-drained soil. The fiber of the Pita plant is long and strong and would be classed commercially as a hard fiber, and could be used as a substitute for sisal, abaca (Manila hemp), and other hard fibers.—H. N. Vinall.

1594. EGGINTON, G. E., AND W. W. ROBBINS. Irrigation water as a factor in the dissemination of weed seed. *Colorado Agric. Exp. Sta. Bull.* 253. 25 p. 1920.—Weed traps of wire netting were placed in irrigation ditches and at the end of varying periods their contents were removed, dried, and examined. In 156 traps from 3 different ditches 81 species of weed seeds were found. The factors influencing the number of seeds carried are enumerated and explained: (1) Flora of ditch bank and adjacent territory; (2) season of year; (3) direction and velocity of wind; (4) velocity of water and character of water surface. Continued grazing is recommended as the most effective and most economical method in reducing weed growth. The seeding of ditch banks to brome grass is also suggested.—Elsa B. Eisendrath.

1595. FLYNN, H. C. K. Statistics of crops grown by Europeans in southern Rhodesia for the season 1919-1920. Rhodesia Agric. Jour. 18: 9-16. 1921.—General crop statistics for 1919-1920, compiled from reports sent in by farmers for that period. Figures are given for maize, wheat, ground nuts, beans, kafir corn, sunflowers, buckwheat, cattle melons, pumpkins, rice, Rapola, potatoes, teff grass, oat hay, Napier grass, millet, veld hay, tobacco, and citrus orchards.—*Mary R. Burr.*

1596. FRAPS, G. S. Feeding values of certain feeding stuffs. Texas Agric. Exp. Sta. Bull. 245. 29 p. 1919.—Digestible matter and productive value of foods may be very different. Tests were made with cottonseed meal and cottonseed hulls, showing that the former has almost twice the digestible material but about four times the productive value of the latter. Compositions and feeding values are given for acorns, alfalfa hay, bear grass, beet pulp, corn cobs, cotton burs, cottonseed, peanut meal, prairie hay, rice bran, rice hulls, Rhodes grass hay, soapweed, and Spanish moss.—*L. Pace.*

1597. FRAPS, G. S., AND S. LOMANITZS. The salt or sodium chloride content of feeds. Texas Agric. Exp. Sta. Bull. 271. 14 p. 1920.—A rapid method of estimating chlorides is described, and the chloride content of a number of feeds is given. Eastern alfalfa is lower in chlorides than western. The question as to whether the chlorides in alfalfa are useful, and whether an addition of salt to some alfalfa soils would be beneficial cannot yet be answered.—*L. Pace.*

1598. HARRIS, F. S. The agronomist's part in the world's food supply. Science 52: 395-400. 1920.—The author, looking into the future, finds the problem of feeding an ever-increasing population a more and more difficult one. An increased production will be called for, which can be realized in 2 ways: 1st, by extending the producing area; 2nd, by increasing the acre yield of the present cultivated area. The methods for enlarging the agricultural area are discussed under the following headings: Increasing the irrigated area; extending dry farming; draining the wet lands; and reclaiming the alkali lands.—*A. H. Chivers.*

1599. HOEK, P. VAN. Verslag over den Landbouw in Nederland. [Report on Agriculture in the Netherlands.] Verslag. en Mededeel. Directie Landb. 1920: 1-116. 1920.—Reports are given on production and condition of farm crops, vegetables, fruits, seeds, bulbs; other agricultural and horticultural activities in the Netherlands are likewise considered.—*J. C. Th. Uphof.*

1600. HOFFMAN. Kartoffeldüngungsversuche mit Kalisulfaten im Erntejahr 1920. [Potato fertilizing experiments with potassium sulphate in the season 1920.] Mitteil. Deutsch. Landw. Ges. 36: 116. 1921.—Potassium sulphate was compared with a potassium-magnesium sulphate; no additional advantage resulted from the use of the latter.—*A. J. Pieters.*

1601. LEIPZIGER. Bericht über einige Gras- und Kleebau-betriebe Norddeutschlands. [Report on some grass and clover seed operations of north Germany.] Mitteil. Deutsch. Landw. Ges. 35: 134-135. 1921.—An account of a visit to several farms where grass and clover seeds are grown as special crops. Selection of color for winter hardiness was being carried on near Niendorf.—*A. J. Pieters.*

1602. LEPPAN, H. D. The production of foodstuffs for live stock in South Africa. South African Jour. Indust. 3: 1116-1130. 1920.—Agronomic production is related to rainfall, soils, altitudes, and latitude, and the author discusses these factors for South Africa. The acre yields of most crops are low, the average for maize being 7-10 bushels; the causes of the low yields are said to be generally careless methods of farming and attempts to grow unsuitable crops. Feed stuffs to supplement grazing are greatly needed and the making of silage is urged. The author lists and discusses the chief summer and winter forage crops, noting that "the cultivated grasses of promise in South Africa to-day are all indigenous to Africa, chiefly tropical Africa." The most important summer forage crops are maize, lucerne, Teff grass (*Eragrostis Abyssinica*), millets (*Chaetocloa*, *Echinochloa*, *Pennisetum*), cowpeas, soybeans,

and sorghums. Besides Teff grass, Sudan, Kikuyu (*Pennisetum longistylum*), Toowoomba grass (*Phalaris bulbosa*), and Napier or Elephant grass (*Pennisetum purpureum*) do quite well. Among the most important of what may be called the minor agricultural grasses in South Africa are *Paspalum dilatatum* (Water grass), *Paspalum virgatum* (Erect Paspalum), *Festuca arundinacea* (New Zealand tall Fescue), *Festuca ovina* (Italian Fescue), *Dactylis glomerata* (Cocksfoot), *Lolium mutiflorum* (Italian rye grass), and *Chloris gayana* (Rhodes grass). Blaauwzaad grass (*Chloris virgata*) has done well in parts of the Orange Free State and in the Transvaal. Root crops are grown under irrigation, and Kaffir melons, pumpkins, ground nuts, artichokes, sunflowers, and velvet beans are grown to some extent. Tepary beans, Kudzu, and Mung beans have recently been introduced and seem worthy of attention. The chief winter crops are the grains, rape, vetches, and peas.—*A. J. Pieters*.

1603. McDONALD, A. H. E. Cutting Sudan grass for seed. Agric. Gaz. New South Wales 32: 85. 1921.—In New South Wales best results are secured when the 2nd or 3rd growths are cut for seed. Binders are used for harvesting.—*L. R. Waldron*.

1604. MAIDEN, J. H. Chats about the prickly pear. No. 9. Agric. Gaz. New South Wales 32: 97-104. 4 fig. 1921.—The author discusses *Opuntia aurantiaca*, *O. elatior*, *O. inermis*, *O. tomentosa*, *O. ficus-indica*, *O. robusta*, *O. monacantha*, *O. Dillenii*, and *O. cochinillifera* as noxious weeds. Distribution, taxonomy, and morphological characters of the species are considered.—*L. R. Waldron*.

1605. MUNDY, H. G. Kudzu vine. (*Pueraria thunbergiana*). Rhodesia Agric. Jour. 18: 83-88. Fig. 1-2. 1921.—Kudzu, an extremely promising legume, has been grown at the Salisbury experiment station since 1918. It makes an early spring growth, and gives a heavy yield of nutritious fodder, apparently palatable either green or dry for all classes of stock. Kudzu produces root nodules freely and leaves a large amount of decaying vegetable matter on the land; consequently, it should be valuable as a soil renovator.—*Mary R. Burr*.

1606. MUNDY, H. G. Wheat in Rhodesia. Rhodesia Agric. Jour. 17: 501-512. 6 fig. 1920.—The present annual consumption of wheat in southern Rhodesia is some 31,000 bags in excess of production. The paper discusses cultural methods for wheat growing, varieties, harvesting and threshing, and diseases and pests. Summer wheat cannot be grown because of rust; winter wheat may sometimes suffer from rust, but not seriously. Some work has been done in selection of resistant varieties but so far with no permanent success. Smut is prevalent and seed treatment is urged. Deaf ear or white ear is caused by frost at blossoming time. This can be prevented by seeding at such a time that the plant does not bloom until after frost or by grazing to retard the maturity of the plant.—*A. J. Pieters*.

1607. NOLTE, O. Düngungsversuche mit magnesiahaltigen und magnesiafreien Kalisalzen. [Fertilizer experiments with magnesia-free and magnesia-containing potash salts.] Mitteil. Deutsch. Landw. Ges. 36: 136. 1921.—Both potassium-magnesium sulphate and potassium chloride failed to increase the yield of potatoes in this experiment, although on the same field, but in another experiment, potassium sulphate produced a large increase in yield.—*A. J. Pieters*.

1608. Παπαγεωργίου Πηλ. Συμβολή εις την Ελληνικην Σιτηρογραφίαν. [PAPAGEORGIOU, PELEUS. Contribution to Greek cereology. Part 1, wheat.] 139 p. Athens, 1919.—A short treatise, or monograph, dealing with the cultivated kinds of wheat in all of the different parts of Greece, with a brief introduction on selection, breeding, the cereology of ancient Greece, and the importance of wheat cultivated in modern Greece. The native varieties especially adapted to the climatic conditions of Greece are examined and information as to yield, time of sowing, soil and rainfall requirements are fully discussed. The species of wheat, *Triticum polonicum*, *T. durum*, *T. turgidum*, *T. sativum*, *T. spelta*, *T. amyleum*, and *T. monococcum* are discussed and illustrated. A table of the main species of wheat with their most important varieties is included. A bibliography is also given.—*Geo. Bouyoucos*.

1609. PRIDHAM, J. T. The origin and history of Sunrise oats. *Agric. Gaz. New South Wales* 32: 88-90. 2 fig. 1921.—The variation was noticed in 1910 and probably arose from field cross between wild oats (*A. fatua*) and Algerian oats (*A. sterilis*). The variety is early and the seed creamy white. Two variations of Sunrise have been named Cowra No. 25 and Cowra No. 27.—*L. R. Waldron*.

1610. PRIDHAM, J. T. Ortlipp's Bungowannah wheat. *Agric. Gaz. New South Wales* 32: 85. 1921.—This variety is the same as Turvey or Turvey's Purple Straw and belongs to the Tuscan group of wheats.—*L. R. Waldron*.

1611. REINECKE, T. G. W. Results of winter cereal experiments at the School of Agriculture, Elsenburg, Mulder's Vlei, Cape Province. *Jour. Dept. Agric. Union of South Africa* 1: 45-54. 1920.—Considering both palatability of hay and yield per acre, combination of the various varieties of oats and vetches have been found the best for hay. For ensilage a mixture of Smyrna oats and spring or French winter vetch can be recommended in addition to hairy vetch and Algerian oats. Rye, barley, wheat, and field peas have not been found desirable crops for hay mixtures.—*E. M. Doidge*.

1612. RINDL, M. Sesame and melon seeds sources of semi-drying oils. *South African Jour. Indust.* 3: 1150-1154. 1920.—The author treats of the production and consumption of the seeds of sesame, its varieties, utilization, cultivation, harvesting, pressing, production in Africa, and prices. The fat content of both fresh and dried melon seeds is given.—*Mary R. Burr*.

1613. SCHERFFIUS, W. H. Cotton culture. Practical advice for the South African grower. *Jour. Dept. Agric. Union of South Africa* 2: 160-162. 1921.—General cultural notes emphasizing the importance of using pure seed and having quality as the principal aim in cotton production.—*Mary R. Burr*.

1614. SCHMID, A. Bericht der Zentralverwaltung der schweizerischen landwirtschaftlichen Versuchs- und Untersuchungsanstalten über die Versuchstätigkeit in den Jahren 1913-1919. [Report of experimental work performed during 1913-1919.] *Landw. Jahrb. Schweiz* 1919: 513-518. 1919.—A brief résumé of field experiments conducted by the Swiss government, including observations on cultural tests with grains, beets, and potatoes; studies of the behavior of various mixtures of grass seeds and of pasture fertilizing; and experiments on the control of diseases and other pests of cultivated plants.—*J. D. Luckett*.

1615. STAFFELD, U. Aussaatstärke unter Berücksichtigung des Tausendkorngewichts. [Rate of seeding in relation to the weight of 1000 grains.] *Mitteil. Deutsch. Landw. Ges.* 35: 408-411. 1920.—A discussion of the relations between the weights of 1000 grains of oats, winter rye, summer and winter wheat, the rate of seeding, and probable yields.—*A. J. Pieters*.

1616. TAYLOR, H. W. Cotton culture. *Rhodesia Agric. Jour.* 17: 436-440. 1920.—Author gives the figures for world cotton production for a period of 20 years (1894-1914). During this period the production of cotton in the United States increased 53.2 per cent and the price per pound 90.4 per cent. America supplies 85 per cent of the cotton used in Great Britain. In southern Rhodesia soil and climatic conditions are favorable for cotton production. General cultural notes are given; also figures showing the value of the crop. The developments of new cotton areas and the stimulation of the industry in Great Britain is urged.—*Mary R. Burr*.

1617. TAYLOR, H. W. Turkish tobacco. *Rhodesia Agric. Jour.* 17: 513-521. Fig. 1-7. 1920.—Turkish tobacco is grown in Rhodesia by a number of planters with varying degrees of success. The crop is easy to grow, but the harvesting and handling require considerable skill which can be acquired only by actual experience. The article gives detailed directions for culture, harvesting, curing, grading, and packing.—*C. V. Piper*.

1618. VOLKART, A., A. GRISCH, UND W. BANDI. Vierzigster und einundvierzigster Jahresbericht der Schweiz. Samenuntersuchungs- und Versuchsanstalt Oerlikon-Zurich.

[Fortieth and forty-first annual reports of the Swiss seed testing station at Oerlikon-Zürich.] Landw. Jahrb. Schweiz 1919: 38-77. 1919.—The reports include: (1) A report of the seed testing station for the years 1916-17 and 1917-18, with a summarized statement of the results of seed tests from 1876 to 1918; (2) a brief review of cultural tests with field crops conducted by the station 1917-18; and (3) a report of work on the control of plant diseases and of weeds during 1917 and 1918.—*J. D. Luckett*.

1619. VOSZ, G. Vergleichende Versuche zur Bekämpfung von Hederich und Ackersenf mit chemischen Mitteln. [Comparative tests of chemicals for the control of hedge-mustard and charlock.] Fühling's Landw. Zeitg. 69: 226-234. 1920.—Results of experiments with kainit, $\text{Ca}(\text{NO}_3)_2$, a mixture of kainit and $\text{Ca}(\text{NO}_3)_2$ in half the full amounts, FeSO_4 and $(\text{NH}_4)_2\text{SO}_4$ for killing hedge-mustard (*Raphanus raphanistrum*) and charlock (*Sinapis arvensis*) in fields of oats. The first 3 materials were dusted on the plants in powdered form early in the morning while the plants were heavily covered with dew, at the following rates per hectare: Kainit, 1000 kgr.; $\text{Ca}(\text{NO}_3)_2$, 140 kgr.; mixture of 500 kgr. kainit and 70 kgr. $\text{Ca}(\text{NO}_3)_2$. The FeSO_4 and $(\text{NH}_4)_2\text{SO}_4$ were applied at the rate of 150 kgr. per hectare in 25 per cent solutions sprayed on the plants just before noon.—The most satisfactory results in all cases were secured with $(\text{NH}_4)_2\text{SO}_4$ solution. In addition to killing the mustard, the solution showed a marked fertilizer effect in increasing the yields of oats. The other materials also gave satisfactory results except that in one case FeSO_4 solution partly damaged the oats, causing a somewhat reduced yield. Next to $(\text{NH}_4)_2\text{SO}_4$, $\text{Ca}(\text{NO}_3)_2$ produced the greatest increases in yield of oats. To get satisfactory results with the powdered chemicals there should be a heavy dew, which should not evaporate too quickly.—*A. T. Wiancko*.

1620. WALSTER, H. L. Which variety for North Dakota? [Part of: "Practical pointers on North Dakota farming."] North Dakota Agric. Exp. Sta. Ext. Div. Circ. 40. 3-8. 1920.—The author recommends varieties of spring wheat, oats, barley, corn, flax, potatoes, sunflowers for silage, hay and pasture crops best adapted to North Dakota conditions.—*L. R. Waldron*.

1621. WALTERS, J. A. T. Fibre crops. Deccan hemp (*Hibiscus cannabinus*) and Sunn hemp (*Crotalaria juncea*). Rhodesia Agric. Jour. 17: 522-528. Fig. 1-4. 1920.—Experimentation has demonstrated the fact that both Deccan hemp and Sunn hemp seem to thrive on the common red and granite soils of Rhodesia under conditions suitable for maize. Both plants are sources of valuable commercial fiber. The adaptability of the 2 crops to Rhodesian conditions makes them highly desirable as constituents in a system of rotation with maize or tobacco.—*Mary R. Burr*.

1622. WHITTET, J. N. Farmers' experiment plots. Grasses and clovers for the North coast. Agric. Gaz. New South Wales 32: 135. 1921.—Rhodes grass (*Chloris gayana*), elephant grass (*Pennisetum purpureum*), canary grass (*Phalaris bulbosa*), Chilean clover (*Trifolium pratense perenne*), and Bokhara clover (*Melilotus alba*) were planted on a private farm for comparative trial. No results are given.—*L. R. Waldron*.

1623. WHITTET, J. N. The production of lucerne seed. With some reference to lucerne culture in our drier districts. Agric. Gaz. New South Wales 32: 105-112. 16 fig. 1921.—Alfalfa trials are under way at Bathurst and Cowra experiment farms and include varieties and geographic strains as follows: Tamworth Broad Leaf, China, Cossack, Semipalatinsk, Montana, Kansas, Bathurst Nos. 6 and 9, and Grimm. The author discusses pollination and the need for testing for purity and vitality. Results of purity test are given; also information for seeding, harvesting, and threshing the crop.—*L. R. Waldron*.

1624. WILLIAMS, C. O. Composition and valuation of fertilizers and feeding stuffs. Jour. Dept. Agric. Union of South Africa 1: 368-382. 1920.—This is a critical account of the various fertilizers and feeding stuffs at present on the South African market.—*E. M. Doidge*.

1625. WINTERS, R. Y., AND V. R. HERMAN. Soybeans for the Piedmont and mountain sections of North Carolina. North Carolina Agric. Ext. Service Ext. Circ. 111. 15 p. 1921.—An agronomic study of the comparative value of soybeans and cowpeas for seed and hay.—*F. A. Wolf*.

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 1608, 1819, 1822, 1837, 1858, 1863, 2020, 2066, 2101)

1626. ANONYMOUS. *A journal of ecology*. *Science* **51**: 161. 1920.—The Plant World has been transferred to the Ecological Society of America, and will be continued as the official organ of that society, under the title of *Ecology*.—*Neil E. Stevens*.

1627. ANONYMOUS. *An unsere Leser*. [To our readers.] *Wiener Allg. Forst- u. Jagd-Zeitg.* **38**: 174. 1920.—Announcement under date of July 2, 1920, of the addition of the word "Wiener" (Vienna) to the title of the journal in order to distinguish it from the German periodical of the same name (*Allgemeine Forst- und Jagd-Zeitung*), under which it was issued from March 5 to June 25, 1920 (v. 38, no. 10–26), having been previously published under the title: *Oesterreichische Forst- und Jagd-Zeitung*.—*F. S. Baker*.

1628. ANONYMOUS. *The botanical survey of the Union of South Africa*. *Jour. Dept. Agric. South Africa* **1**: 180–182. 1920.—See *Bot. Absts.* **8**, Entry 1629.

1629. ANONYMOUS. *Botanical survey of the Union of South Africa*. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* **1919**: 399–403. 1919.—The Advisory Committee was announced Oct. 5, 1918, with Dr. I. B. POLE-EVANS as head and acting director of the survey. Miss A. G. CORBISHLEY was appointed Oct. 15, 1919, as botanical assistant at Kew on work connected with the survey. The scope of the survey is outlined.—*M. F. Warner*.

1630. ANONYMOUS. *Edward John Woodhouse*. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* **1918**: 32. 1918.—Lieut. E. J. Woodhouse, Economic Botanist and Principal of the Agricultural College of Bihar and Orissa, died in France December 18, 1917, at the age of 33.—*M. F. Warner*.

1631. ANONYMOUS. *John Gilbert Baker*. *Gard. Chron.* **III**, **68**: 102. 1920.—Brief sketch of the life and work of J. G. Baker (1834–1920).—*M. F. Warner*.

1632. ANONYMOUS. *Major S. M. Toppin's bequest to the Royal botanic gardens*. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* **1918**: 156–157. 1918.—Important collections made on northwestern frontier of India and in northern Burma, by Sidney Miles Toppin, born June 12, 1878, and killed near Ypres, Sept. 24, 1917.—*Neil E. Stevens*.

1633. ANONYMOUS. *Maurice L. de Vilmorin*. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* **1918**: 190. 1918.—Obituary of M. L. de Vilmorin (1849–1918), senior member of the firm of Vilmorin-Andrieux & Cie., who was specially interested in the introduction of Chinese plants, and who had at his estate of Les Barres a collection of shrubs which was probably the most comprehensive in Europe.—*M. F. Warner*.

1634. ANONYMOUS. *Polozheniye opytного otdela v sisteme organov Komissariata Zemle-deliya*. [The status of the experimental division in the system of organization of the commissariat of agriculture.] *Vestnik Narodnogo Kom. Zeml.* **1**: 55–59. 1919.—An independent division of the Russian Commissariat of Agriculture, designated as the Experimental Division, has been created in the system of the present government of Russia, with the task of uniting, promoting, and directing agricultural experimental work. A higher degree of efficiency and greater coordination of activities in agricultural research is expected through this consolidation. The new office covers climatological, geobotanical, and soil investigations; administrative and financial direction of experiment stations, botanical gardens, and like institutions; meteorology; horticulture; fiber plants; tea; tobacco; oil plants; mineral fertilizers; breeding and selection; agricultural engineering; entomology and phytopathology. The Experimental Division undertakes also to prepare specialists in various lines of agricultural experimentation and to popularize the results of scientific achievements. The Division expects to work in consultation with an advisory board of representatives of various experimental institutions.—*Michael Shapovalov*.

1635. ANONYMOUS. Presentation of the Capt. Scott memorial medal to Dr. I. B. Pole Evans, on May 15th, 1919. South African Jour. Nat. Hist. 2: 12-18. Pt. 1. 1920.—A note on the scientific training and work of Iltyd Buller Pole Evans, with special reference to his services in organizing phytopathological work in the Transvaal, and a list of his publications.—*M. F. Warner.*

1636. ANONYMOUS. Reginald J. Farrer. Nature 106: 413-414. 1920.—Life and work of Reginald John Farrer (1880-1920), collector and cultivator of alpine plants, as well as author of books of fiction and on rock gardens. He received the Gill memorial medal of the Royal Geographical Society in 1920 for work on the Chinese border of Tibet.—*O. A. Stevens.*

1637. ANONYMOUS. R. H. Pearson. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 213. 1918.—Obituary notice of Robert Hooper Pearson (1866-1918), connected since 1892 with the Gardeners' Chronicle, and for the past 10 years its managing editor.—*M. F. Warner.*

1638. ANONYMOUS. Samuel Mills Tracy. Science 52: 270. 1920.—Died at Laurel, Mississippi, September 5th, 1920, aged 73 years.—*M. F. Warner.*

1639. ANONYMOUS. [Sir Edmund Loder.] Bull. Soc. Nat. Acclim. France 67: 97-99. 1920.—Obituary notice. Loder was better known as a zoologist, though he was also noted for his special knowledge of rhododendrons and conifers, publishing in 1913 a list of his magnificent collection of conifers at Leonardslee.—*M. F. Warner.*

1640. ANONYMOUS. T. A. Dorrien-Smith. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 242-243. 1918.—Obituary of Thomas Algernon Dorrien-Smith, who died on August 6th, 1918, in his 73d year. His gardens at Tresco Abbey in the Scilly Islands were especially remarkable for the New Zealand and Australian plants which flourished there. He was the pioneer in the culture of Narcissus on an extensive scale for the English markets, an industry begun about 35 years ago in a time of distress among the Scilly farmers.—*M. F. Warner.*

1641. ÅKERMAN, ÅKE. F. Kølpin Ravn, 10 maj 1873-25 maj 1920. Sveriges Utsadesför. Tidskr. 30: 122-124. 1920. [See also Bot. Absts. 8, Entries 1681, 1708, 1804.]

1642. ALKER, F. R. Botanical gleanings from the writings of early travellers in western Pennsylvania. Trillia 5: 8-22. 1919.—J. D. Schoepf, Thomas Hutchins, William Darby, F. Cumming, and Joseph Doddridge.—*Neil E. Stevens.*

1643. A[RBER], A[GNES]. Edward Alexander Newell Arber (1870-1918). Jour. Botany 56: 305-308. Portrait (facing p. 337). 1918.—E. A. Newell Arber, one of the leading students of systematic paleobotany, was also an authority on plant life in the Alps. The present sketch includes notes on his education and personal characteristics. [See also Bot. Absts. 8, Entry 1772.]—*Neil E. Stevens.*

1644. ARDOUIN-DUMAZET. Les pêcheurs de Montreuil I-II. [Peach culture at Montreuil.] Jour. Agric. Pratique N.S., 33: 126-128, 165-167. 1920.—The first part gives the beginnings of the peach culture which has given to this region the name of Montreuil-aux-Pêches. The first planting is said to have been done by Girardot, a former musqueteer, in the reign of Louis XIV.—*M. F. Warner.*

1645. BAILEY, L. H. R U S; a register of the rural leadership in the United States and Canada. 2nd ed., 533 p. Ithaca, New York, 1920.—Directory of botanical and agricultural workers with brief biographical data. First edition was published Nov., 1918.—*Neil E. Stevens.*

1646. B[AKER], J. G. Matthew B. Slater. Jour. Botany 56: 191. 1918.—Mr. Slater (1830-1918) communicated a number of localities to Mr. J. F. Robinson for his Flora of the East Riding, and as the executor of Richard Spruce placed all the papers relating to Spruce's South American travels in the hands of Dr. Alfred Russell Wallace, who published them as Notes of a Botanist on the Amazon and Andes.—*Neil E. Stevens.*

1647. BALFOUR, F. R. S. **Gaston Allard, of Angers.** Roy. Bot. Gard. Kew Bull. Misc. Inform. **1918:** 124-125. 1918.—Brief obituary of M. Allard, who died in January, 1918, nearly 80 years of age, and a note upon his famous arboretum, containing a large collection of trees from North America, China, Japan, and the Mediterranean littoral, which has been bequeathed to the Pasteur Institute.—*M. F. Warner.*
1648. BOIS, DÉSIRÉ. **Jules Poisson (20 avril 1833—31 novembre 1919).** Bull. Soc. Nat. Acclim. France **67:** 18-19. 1920.—Poisson was extraordinarily gifted in his knowledge of plants, particularly in identification of fragmentary material. He described many new genera and wrote a monograph of the Casuarineae. The genus *Poissonia* (Leguminosae) was dedicated to him by Baillon.—*M. F. Warner.*
1649. BORZI, ANTONINO. [Giovanni Briosi.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. **29:** 118-123. 1920.—Born April 29, 1846; died July 20, 1919. [See also Bot. Absts. 7, Entry 707; 8, Entry 895].—*M. F. Warner.*
1650. BOULGER, G. S. **A seventeenth-century botanist friendship.** Jour. Botany **56:** 197-202. 1918.—Evidence of the friendship of the elder John Tradescant with Parkinson is found in the numerous passages of his *Paradisus* in which Parkinson mentions Tradescant. At the end of the copy of the *Paradisus* here discussed there is, apparently in the handwriting of John Tradescant himself, a list of plants received in various years. Also a manuscript list, almost certainly in the handwriting of Elias Ashmole, of Trees found in Mr. Tradescants Ground when it came into my Possession. The date of this list is probably about 1662.—*Neil E. Stevens.*
1651. BOWER, F. O. **Botanical research in the United Kingdom during the war.** Amer. Jour. Sci. **47:** 117-122. 1919.—A summary of the more important botanical discoveries and publications during the period of the great war.—*Neil E. Stevens.*
1652. BRAUN, SIEGFRIED. **Zum 200jährigen Jubiläum der Baumschulfirma Ludwig Späth in Berlin-Baumschulenweg am 11. September 1920.** [For the celebration of the 200th anniversary of the nursery firm Ludwig Späth, September 11, 1920.] Möllers Deutsch. Gärt. Zeitg. **35:** 232-233, 238-240, 258-260. *Illus.* 1920.—The business was founded in September, 1720, by Christoph Späth, who died May 1, 1746, aged 50 years, and has been carried on by the family for 5 successive generations: Karl Friedrich (1721-1782), Karl Friedrich, Jr. (1768-1831), Johann Ludwig Karl (1793-1883), Franz (1839-1913), and the present head of the firm, Dr. Hellmut Späth.—*M. F. Warner.*
1653. [BRITTEN, JAMES.] **An averted calamity.** Jour. Botany **56:** 50-52. 1918.—This note deals chiefly with the contemplated appropriation of the buildings of the British Museum (Natural History) for war purposes. The last paragraph, however, names various ways in which the department of botany of that institution has rendered direct service to the government during the war.—*Neil E. Stevens.*
1654. BRITTEN, JAMES. **Tournefort's "Topographie Botanique."** (Bibliographical notes LXXI.) Jour. Botany **56:** 118-121. 1918.—A description of a little-known manuscript, now in the Department of Botany of the British Museum, with references to information regarding this and other manuscripts of Tournefort.—*Neil E. Stevens.*
1655. BRITTEN, JAMES. **Maund's "The Botanist" (1836-1842?).** (Bibliographical notes. LXXIII.) Jour. Botany **56:** 235-243. 1918.—The first number of *The Botanist* was printed about September, 1836, and the last probably in 1842, as determined by evidence presented in this note. The magazine is described and a list of the new species published therein is given; as well as some notes on the "conductor," Benjamin Maund, and several contributors.—*Neil E. Stevens.*

1656. BRITTEN, JAMES. *Blake's plant names*. Garden **84**: 80-81, 243-244, 276. 1920.—Identification of plants described under old (and very badly spelled) English common names in STEPHEN BLAKE's *Compleat Gardeners Practice*. [See also Bot. Absts. 8, Entries 1674, 1717.]—*M. F. Warner*.

1657. [BRITTEN, JAMES.] *Clarence Bicknell*. Jour. Botany **56**: 303. 1918.—Clarence Bicknell (1842-1918) was the author of a quarto volume (1885) on the Flowering Plants and Ferns of the Riviera and Neighboring Mountains.—*Neil E. Stevens*.

1658. [BRITTEN, JAMES.] *Claude Frederick Hugh Monro*. Jour. Botany **56**: 335. 1918.—Monro (died Aug. 14, 1918, aged 55) was a collector of plants in Rhodesia, and published 2 papers, 1 on the grasses and 1 on the trees of the region.—*Neil E. Stevens*.

1659. BRITTEN, JAMES. *The cultivated dahlia*. Jour. Botany **56**: 33-35. 1918.—The introduction of the dahlia to the gardens of England was practically due to Lady Holland who, in 1804, sent seeds from Spain.—*Neil E. Stevens*.

1660. BRITTEN, JAMES. *The Duchess of Beaufort's flower drawings*. Garden **84**: 428-429. 1920.—The Duchess, who died in 1714, was the friend of Sir Hans Sloane and in correspondence with the principal botanists and horticulturists of her day. Her herbarium, now in the Department of Botany of the British Museum (Natural History), is frequently quoted in Aiton's *Hortus Kewensis* for the first introduction of plants into England. These 2 volumes of paintings of plants grown at Badminton at the beginning of the 18th century include a great many species which have hitherto been supposed to have been introduced to living collections at a much later date, while a number of them are no longer in cultivation. The plates of the 1st volume were done by Everard Kickius and some of them are very fine; while those of the other volume, by Daniel Frankeom, have less artistic merit, but are very faithful representations.—*M. F. Warner*.

1661. [BRITTEN, JAMES.] *Edward Walter Hunnybun (1848-1918) and "The Cambridge British Flora"*. Jour. Botany **56**: 248-250. 1918.—A short sketch of Hunnybun's life is preceded by a description of his methods of work in preparing illustrations for *The Cambridge British Flora*.—*Neil E. Stevens*.

1662. [BRITTEN, JAMES.] *Ernest David Marquand (1848-1918)*. Jour. Botany **56**: 187-189. 1918.—Marquand was "an all-round naturalist," best known for his studies on the flora of Guernsey.—*Neil E. Stevens*.

1663. BRITTEN, JAMES. *Felix Gilbert Wiltshire (1882-1917)*. Jour. Botany **56**: 117-118. 1918.—Wiltshire was in charge of the library of the Department of Botany of the British Museum from 1905 until he entered the army in 1916, and contributed various important bibliographical notes to the *Journal of Botany*.—*Neil E. Stevens*.

1664. BRITTEN, JAMES. *"John" Roxburgh*. Jour. Botany **56**: 202-203. 1918.—The supposed botanist of this name seems to be fictitious. The collecting attributed to him was probably done by WILLIAM ROXBURGH, author of the *Flora Indica*, whose son James bore part of the expense of its publication.—*Neil E. Stevens*.

1665. BRITTEN, JAMES. *Lady Anne Monson (c. 1714-1776)*. Jour. Botany **56**: 147-149. 1918.—Lady Monson was a student of the plants and insects of the East Indies.—*Neil E. Stevens*.

1666. BRITTEN, JAMES. *Morandi's 'Historica [sic] Botanica Practica.'* (Bibliographical notes LXXII.) Jour. Botany **56**: 212-217. 1918.—Description of the *Historia Botanica Practica* (Mediolani, 1744) of Giovanni Battista Morandi, and of a very interesting manuscript in the Department of Botany of the British Museum which comprises 122 original drawings for this book, and 4 works in Morandi's own hand: an *Explicatio Plantarum*, which

partly corresponds to that in the *Historia*, a Dilucidatio vocum quibus rei Herbariae Scriptores uti solent, and 2 smaller works.—*M. F. Warner*.

1667. BRITTEN, JAMES. **The name Mundia.** *Jour. Botany* **53**: 56. 1918.—The name seems to have been given in honor of a collector of South African plants named Mundt or Mund, not in honor of Henry Mundy.—*Neil E. Stevens*.

1668. [BRITTEN, JAMES.] **Newspaper botany.** *Jour. Botany* **58**: 136, 208. 1920.—Errors and absurdities noted in the *Daily News* and *Nash's Magazine*.—*M. F. Warner*.

1669. [BRITTEN, JAMES.] **The shamrock.** *Jour. Botany* **58**: 117–118. 1920.—Some newspaper blunders in regard to this plant.—*M. F. Warner*.

1670. BRITTEN, JAMES. **Sir George Birdwood and "Primrose Day."** *Jour. Botany* **56**: 87–90. 1918.—Sir George Christopher Molesworth Birdwood (1832–1917) was particularly interested in commercial vegetable products of Biblical and classical interest and was the first to identify the frankincense plant. The celebration of the anniversary of Lord Beaconsfield's death by the wearing of primroses was initiated by him.—*Neil E. Stevens*.

1671. BRITTEN, JAMES. **Worthington George Smith (1835–1917).** *Jour. Botany* **56**: 243–247. 1918.—W. G. Smith was educated as an architect and illustrator, but the study of ancient ornament led him to the study of plant form and later to botany. He is known for his researches on fungi, and especially for his colored illustrations of fungi and other plants. [See also *Bot. Absts.* 6, Entry 62; 8, Entry 1683.]—*Neil E. Stevens*.

1672. BROTHERSTON, R. P. **About tomatoes.** *Garden* **83**: 86. 1919.—As early as 1578 both white and yellow sorts were recorded by Lyte as cultivated in England. They were often called "Love apples" or "Apples of love" in the early literature, but the true "Love apple" was *Solanum ovigerum*.—*M. F. Warner*.

1673. BROTHERSTON, R. P. **Bacon's plants.** *Garden* **84**: 129. 1920.—It is concluded that the double white violet mentioned in Bacon's essays and *Sylva sylvarum* was a stock, and the "White Satyrian" of the *Sylva* was *Neottia spiralis*.—*M. F. Warner*.

1674. BROTHERSTON, R. P. **Blake's plant names.** *Garden* **84**: 52. 1920. [See also *Bot. Absts.* 8, Entries 1656, 1717.]

1675. BROWNE, E. T. **Ernst Heinrich Philipp August Haeckel.** *Proc. Linn. Soc. London* **132**: 39–43. 1921.—Sketch of the life and work of the eminent zoologist and evolutionist Ernst Haeckel (1834–1919), who in earlier years was also an enthusiastic botanist.—*M. F. Warner*.

1676. BUNYARD, E. A. **The moon and horticulture.** *Garden* **84**: 186. 1920.

1677. BUNYARD, E. A. **The "New orchard and garden" of William Lawson.** *Jour. Pomology* **1**: 125–134. *Fig. 16*. 1920.—Although Johnson's *History of English Gardening* gives the date as 1597, Lawson's book seems to have been actually published in 1617, and to have gone through 9 editions. Bunyard quotes from, and comments briefly upon, the different chapters.—*L. H. MacDaniels*.

1678. C., R. S. **Curtis's "Botanical magazine."** *Garden* **84**: 3. 1920.—Varying dates in early volumes, and variations in date of same plate in different sets are noted. Dates on title-pages of an original set are 1787, 1788, 1790, etc., but a short set has 1790 as date of Vol. 1; and in a set of 45 Vols., evidently reprints, Vol. 1 is dated 1793. Dates of many individual plates are noted, but no water marks were discovered before 1810.—*M. F. Warner*.

1679. CARDIFF [WALES] PUBLIC LIBRARY. Catalogue of early works on botany, agriculture, and horticulture. Exhibited in connection with the Royal Agricultural Show. 23 p. Printed for the Library Committee of the Cardiff Corporation by the Western Mail Ltd.: Cardiff, 1919.—A brief list, but with rather full titles and full imprints. Annotated and arranged under date of 1st edition.—*Neil E. Stevens.*

1680. CAVARA, FRIDIANO. In memoria di tre botanici napoletani. [In memory of three Neapolitan botanists.] Bull. Orto Bot. Napoli 4: 317–327. Portraits. 1918.—FORTUNATO PASQUALE (1856–1917), whose interest was in the local flora of southern Italy. ORAZIO COMES (1848–1917), was specially known for his work in phytopathology, wrote many mycological works, and made an extended study of tobacco. ACHILLE TERRACIANO (1861–1917), worked in systematic and geographical botany and plant morphology.—*M. F. Warner.*

1681. CHRISTENSEN, H. R. Frederik Kølpin Ravn. Tidsskr. Landøkonomi 1920: 261–264. Portrait. 1920.—Born at Aalborg, Denmark, May 10, 1873, and died May 25, 1920, at East Orange, New Jersey. A short account of his life and work in plant pathology.—*M. F. Warner.*

1682. CLINTON, G. P. William Gilson Farlow. Phytopathology 10: 1–8. Portrait. 1920.—An appreciation of the work of W. G. Farlow (1844–1919) with personal notes and anecdotes, written by a former student and close personal friend. [See also Bot. Absts. 6, Entries 916, 947, 956, 963, 1463, 1470; 7, Entry 1593; 8, Entries 833, 1784, 1785.]—*Neil E. Stevens.*

1683. C[OTTON], A. D. Worthington G. Smith. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 30–31. 1918.—Obituary notice of W. G. Smith (1835–1917), best known to readers of the Gardeners' Chronicle for his illustrations made for that journal for more than 40 years, but who was also an antiquarian and a well-known mycologist.—*M. F. Warner.*

1684. COULTER, J. M. Journal of the Arnold Arboretum. Bot. Gaz. 69: 95–96. 1920.—A notice of the appearance of the first number (July, 1919) of this new quarterly journal.—*H. C. Cowles.*

1685. D. The lettuce. Gard. Chron. III, 67: 192–193, 201. Figs. 1920.—Chiefly cultural, but prefaced by notes on early history. There are 6 varieties mentioned by Gerarde (1597), and 15 in Miller's Gardeners' Dictionary (1757). There are differences of opinion in regard to the origin of the Cabbage and Cos lettuces, but both are probably from one species, *Lactuca scariola*, a native of central Europe and Asia. Crescentius (13th century) mentions *Lactuca romana*, which probably gave name to the French Laitue romaine or Romaine.—*M. F. Warner.*

1686. DEMAREST, S. A. A sketch of the life of Coe Finch Austin. Mem. Torrey Bot. Club 17: 31–38. 1918.—An intimate account by his daughter of C. F. Austin (1831–1880) who was best known for his work on mosses.—*Neil E. Stevens.*

1687. DETMER, WILHELM. Ernst Stahl, seine Bedeutung als Botaniker und seine Stellung zu einigen Grundproblemen der Biologie. [Ernst Stahl, his importance as a botanist and his position regarding some fundamental problems in biology.] Flora 111–112: 1–47. 1918.—The introduction deals briefly with the education and personality of Christian Ernst Stahl, but the bulk of the paper is devoted to a detailed review of his work, including both the results of his investigations in various fields, and his opinions on such questions as vitalism and natural selection. [See also Bot. Absts. 8, Entry 1697.]—*Neil E. Stevens.*

1688. DIXON, H. N. Robert Braithwaite (1824–1917). Jour. Botany 56: 23–25. 1918.—An appreciation of the scientific work of Dr. Braithwaite, especially in bryology. His herbarium is now in the British Museum (Natural History).—*Neil E. Stevens.*

1689. DURHAM, H. E. Past masters of garden craft. [Rev. of: MARSHALL, LIZZIE B. *L'horticulture antique et la poésie de Columelle (De re rustica livre X)*. Thèse accepté pour le doctorat de l'Université de Paris. Hachette et Cie.: Paris, 1918.] *Gard. Chron.* III, 66: 77. 1919.—"Columella wrote to guide the gardener with much detail and precision, and especially to help the owner of a small plot that he might reduce his daily bill for food by growing it himself." Eleven flowers are dealt with, and vegetables and herbs together to the number of 63, including 15 Brassicas.—*M. F. Warner*.

1690. DURHAM, H. E. What is a broccoli? *Gard. Chron.* III, 65: 243-244. 1919.—Historical and etymological note.—*Neil E. Stevens*.

1691. E[BERLE], E. G. Henry Hurd Rusby. *Jour. Amer. Pharm. Assoc.* 9: 1131-1132. *Portrait*. 1920.—A brief sketch of the life and activities of Doctor Rusby, who has been recently appointed to take charge of the Mulford Biological Exploration of the Amazon Basin.—*Anton Hogstad, Jr.*

1692. ESSARY, S. H. Samuel McCutchen Bain. *Phytopathology* 10: 185-188. *Portrait* (pl. x). 1920.—Born Eagleville, Tennessee, Jan. 14, 1869; died Knoxville, Jan. 30, 1919. His investigations on disease resistance in plants and his work as a teacher of botany are referred to. A chronological list of his publications is given.—*Neil E. Stevens*.

1693. FEDELI, CARLO. Il primo Orto botanico Pisano. [The first botanical garden of Pisa.] *Atti. Soc. Toscana Sci. Nat. Pisa* (Proc. Verb.) 27: 8-20. 1918.—Its original location in the "Cittadella Vecchia," or ancient citadel, is confirmed, and by careful comparison of documents the author clears up some confusion in dates, proving that on Oct. 27, 1544, the duke Cosimo I had already removed the monastery of S. Vito to make room for the garden; that Luca Ghini, then lecturer at Bologna, who had been invited to the chair of botany at Pisa, had not arrived there on Oct. 28, 1544, but that his first remuneration was recorded on the first Monday of March, 1545, while one of his letters, dated July 4, 1545, shows that the garden was functioning perfectly at that date.—*M. F. Warner*.

1694. FOËX, ETIENNE. Rapport sommaire sur la situation de la Société de Pathologie Végétale, au 31 décembre 1920. [Report of the condition of the Phytopathological Society of France. December 31, 1920.] *Bull. Soc. Path. Veg. France* 7: 133-134. 1920.—Report of the general secretary calling attention to the increase in membership and cooperative arrangements made with agricultural journals and also with the federation of natural history societies of France.—*C. L. Shear*.

1695. G[AMBLE], J. S. J. H. Lace, C.I.E., F.L.S. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 341. 1918.—John Henry Lace, who died in June, 1918, spent over 30 years as forest officer in the Punjab, British Baluchistan, Bengal, and Burma, and was an accurate botanist. His List of the Trees, Shrubs, and Climbers of Burma is the standard work in that field, and he described many new species in the *Decades Kewenses*. A nearly complete set of his collections is found at Kew, while his own herbarium has been presented to the Royal Botanic Garden at Edinburgh.—*M. F. Warner*.

1696. GAMBLE, J. S. John Henry Lace. *Proc. Linn. Soc. London* 131: 56-57. 1919.—Brief sketch of life and work of J. H. Lace (1857-1918) forest officer and botanist. [See also *Bot. Absts.* 8, Entry 1695.]—*M. F. Warner*.

1697. GERHARDT, KARL. Dem Andenken an Ernst Stahl. *Naturwiss. Wochenschr. N.F.*, 19: 145-149. 1920.—In memory of Christian Ernst Stahl, born June 21, 1848, died December 3, 1919. Estimate of his botanical work and appreciation of Stahl as teacher and friend. [See also *Bot. Absts.* 8, Entry 1687.]—*M. F. Warner*.

1698. GROSE, L. R. Maple sugar in colonial times. *Amer. Forestry* 26: 689-690. 1920.—Tench Coxe, in his *View of the United States* (Philadelphia, 1794), recommended the sugar

maple lands of Pennsylvania and New York as a source of general sugar supply for the United States. Although negligible from this point of view, maple sugar was of great importance among the colonial settlers and the Indians, as shown by quotations from early accounts as far back as 1684, in regard to the making of sugar from the "juice of the maple."—A. C. Atwood.

1699. GROVES, JAMES. *Newspaper botany*. Jour. Botany **58**: 55. 1920.—Criticism of an article in the Daily Telegraph of January 14, 1920, which includes among noxious weeds *Spartina Townsendii*, well known for its value as a mud-binding plant.—M. F. Warner.

1700. GUADAGNO, MICHELE. *La vegetazione della penisola sorrentina*. [Flora of the Sorrento peninsula.] Bull. Orto Bot. Napoli **4**: 133–178. 1918.—A list of works relating to this region, a branch of the Apennines terminating in the island of Capri, together with a brief physical description, and a very full account of botanical exploration from early times. Species described by early authors are enumerated, and a list of those collected by PIER ANTONIO MICHELI in 1710 is printed from his manuscript catalogue of 1714. Biographical data are supplied for many of the older and more obscure authors and collectors.—M. F. Warner.

1701. GUNTHER, R. T. *The garden of the Rev. Walter Stonehouse at Darfield Rectory, in Yorkshire, 1640*. Gard. Chron. III, **67**: 240–241, 256, 268–269, 296. Fig. 116, 137. 1920.—Stonehouse was a friend and correspondent of William How, author of *Phytologia Britannica* (1650). He was established at Darfield in 1631, but after 1644 forcibly ejected by the Parliamentary Commissioners and imprisoned; he died in 1655, aged 58. Among the manuscripts of Magdalen College are 2 lists of plants grown at Darfield in 1640–1644, which are printed herewith; also plans of the garden and saffron garth in 1640. Stonehouse estimated the number of his plants as 866 in 1644, and they included 14 species from Virginia, 5 from Guinea, and 4 from New England. [See also Bot. Absts. 7, Entry 699.]—M. F. Warner.

1702. H[ALL], A. D. *Spencer Pickering*. Nature **106**: 509–510. 1920.—Percival Spencer Umfreville Pickering (1858–1920) began his scientific career as a chemist, brilliantly demonstrating the hydrate theory of solution. His most important work, however, has been on the scientific problems of fruit growing, notably the poisonous effect upon trees of the root-excretions of grasses. *Science and Fruit Growing*, published in 1919, embodies the results of the Woburn experiments since 1896.—M. F. Warner.

1703. HAMBLIN, S. F. *Gardening books for the client*. Landscape Architecture **10**: 121–127. 1920.—List of about 85 modern books, grouped under: (1) nature study and botany; (2) garden plants; (3) garden making; and (4) garden experiences.—N. E. Stevens.

1704. HARRIS, D. F. *Anthony van Leeuwenhoek, the first bacteriologist*. Sci. Monthly **12**: 150–160. 1921.—This paper describes a bacteriologist's visit to Leeuwenhoek's grave and native city and his thoughts concerning some of the early workers.—L. Pace.

1705. HARSHBERGER, J. W. *The old gardens of Pennsylvania, I.—Bartram arboretum and park*. Garden Mag. **32**: 78–80. Illus. 1920.—Begun by John Bartram in 1730, at Kingsessing, now within the city of Philadelphia. In it were planted many of the trees, shrubs, and herbs collected by Bartram and his son William on their travels. A number of the surviving old trees are mentioned and illustrated.—M. F. Warner.

1706. HARSHBERGER, J. W. *The old gardens of Pennsylvania, II.—Humphry Marshall's*. Garden Mag. **32**: 137–139. Illus. 1920.—The arboretum of Humphry Marshall (Oct. 10, 1722–Nov. 5, 1801) was founded in 1773 near the present village of Marshallton in Chester county. Many large trees are still standing which were planted by him, and which furnished practical knowledge for his *Arbustum Americanum*: the American Grove (Philadelphia, 1785). The article is illustrated with photographs of some of these old trees and views of Marshall's house.—M. F. Warner.

1707. HEMSLEY, W. B. J. R. Jackson. Gard. Chron. III, 68: 234. 1920.—John Reader Jackson, born May, 1834; died October 28, 1920. In 1858 he became keeper of the Kew museums, which post he held until his retirement in 1901. He wrote many articles on economic botany for the Technologist, Pharmaceutical Journal, Gardeners' Chronicle, and other periodicals, and published a valuable work, Commercial Botany of the Nineteenth Century.—*M. F. Warner.*

1708. HENNING, ERNST. F. Kølpin Ravn. K. Landtbruks Akad. Handl. och Tidsskr. 59: 352–354. Portrait. 1920.—Account of his life and mycological work. [See also Bot. Absts. 8, Entries 1641, 1681, 1804.]—*M. F. Warner.*

1709. HOEK, P. VAN. Lijst van officieele personen, Instellingen en Vereenigen op Land-en Tuinbouwgebied. [List of officials, institutions and societies in agriculture and horticulture.] Verslag. en Mededeel. Directie Landb. [Nederland] 1919²: 1–156. 1919.—A list, with names of officials, of all agricultural and horticultural government and private institutions, laboratories, colleges, schools, societies, in the Netherlands.—*J. C. Th. Uphof.*

1710. HOEK, P. VAN. Lijst van officieele personen, Instellingen en Vereenigen op Land-en Tuinbouwgebied. [List of officials, institutions and societies in agriculture and horticulture.] Verslag. en Mededeel. Directie Landb. [Nederland] 1920²: 1–120. 1920.—A list with names of officials, of all agricultural and horticultural government and private institutions, laboratories, colleges, schools, and societies in the Netherlands.—*J. C. Th. Uphof.*

1711. HOFFMANN, PAUL. Urkundliches von und über Christ'an Conrad Sprengel. [Documentary records by and about Christian Conrad Sprengel.] Naturwiss. Wochenschr. N.F., 19: 692–695. 1920.—Records of Sprengel's birth, matriculation at the University of Halle, and other important events in his life are reproduced.—*Neil E. Stevens.*

1712. HOLMAN, G. H., AND F. S. CHAMBERS. Cranberry pioneers of Ocean County. Proc. Amer. Cranberry Growers' Assoc. Ann. Convention 50: 7–10. 1919.—This is a sketch of the history of cranberry growing in Ocean County, New Jersey.—*J. K. Shaw.*

1713. HOLMES, G. K. Three centuries of Tobacco. U. S. Dept. Agric. Yearbook 1919: 151–177. 1920.—A statistical presentation of the important facts and factors in the development of the tobacco industry in its agricultural, commercial and industrial aspects from colonial times to the present. Analysis of consumption shows a great gain in use, being now two-thirds of production. The analysis of the industrial aspect shows the industry to be one of considerable magnitude and importance. A brief note is included on tobacco in use among natives of the Americas before European settlement and on the beginnings of cultivation in the Virginia Colony, where the first was grown by John Rolfe at Jamestown in 1612.—*C. J. Shirk.*

1714. J[ACKSON], B. D. Henry Worsley Seymour Worsley-Benison. Proc. Linn. Soc. London 131: 67. 1919.—Born Aug. 14, 1845; died Dec. 14, 1918. He was lecturer in botany at Westminster Hospital, 1877–1889, and wrote two popular books on natural history, as well as papers on Darwin, and on the power of movement in plants.—*M. F. Warner.*

1715. J[ACKSON], B. D. Sir Frank Crisp. Proc. Linn. Soc. London 131: 49–51. 1919.—Obituary of Sir Frank Crisp (1843–1919), a lawyer whose hobby was microscopy, who had a fine museum of instruments and apparatus, with a complete collection of books on the microscope. As one of the secretaries of the Royal Microscopical Society he effected great improvements in its Journal from about 1878. He was also a generous patron of the Linnean Society.—*M. F. Warner.*

1716. JACOB, JOSEPH. C. G. van Tubergen (died January 25, 1919, aged 74 years). Garden 83: 87. 1919.—Personal appreciation of the head of the Haarlem firm of bulb growers of that name.—*Neil E. Stevens.*

1717. JACOB, JOSEPH. "The compleat gardener's practice." I-II. Garden **84**: 6-7, 20-21. 1920.—A very rare book by "Stephen Blake, gardener," London, 1664. Nothing is known of him save what may be learned from this book, which is especially interesting for its vernacular names of plants, now mostly obsolete and many of them unrecognizable on account of Blake's erratic spelling. [See also Bot. Absts. 8, Entries 1656, 1674.]—*M. F. Warner*.

1718. JACOB, JOSEPH. Orange thyme. Garden **83**: 111. 1919.—After an exhaustive search this herb was found listed in The Modern Gardener or Universal Kalendar, published from the manuscript of Thomas Hitt by James Meader in 1771.—*Neil E. Stevens*.

1719. JACOB, JOSEPH. Some tales of the tulip. Garden Mag. **32**: 23-35. *Illus.* 1920.—Reference is made to the literature of the tulip mania in Holland (1635-1637), such as T'Samenspraecken tusschen Waermondts ende Gaergoedt, published by Adriaen Roman at Haarlem in 1637. The tulip has made a place for itself in general literature as well, for instance Addison's letter to the Tatler, Aug. 31, 1710, Edward Young's Universal Passion, 1725, and Jean de la Bruyère's Characters, originally published in 1688 and often translated into English. The Hortus Floridus of Crispin de Pas, 1614, is also mentioned, and the first tulip monograph, Le Floriste François by La Chesnée Monstereul, which was printed at Caen in 1654. One of the illustrations is a reproduction of the title-page of the latter which was printed at Rouen in 1658 and added to the original work. Other more modern literature is mentioned, concluding with the important historical study, Weizen und Tulpe, of Solms-Laubach, published in 1899.—*M. F. Warner*.

1720. JACOB, JOSEPH. Tulip tittle-tattle.—An early reference to tulip fanciers. Garden **84**: 525. 1920.—Sir Thomas Browne, in his Garden of Cyrus, or the Quincunciall Lozenge, mentions the tulip, and gives marginal references to the works of Lauremberg and Petrus Hondius, whose Dapes Inemptae (probably published about 1619), records and disapproves the growing taste for tulips; while Lauremberg uses the word "Tulipomania" in 1632, 3 years before the time of the mania in Holland.—*M. F. Warner*.

1721. JÄGGLI, MARIO. L'attività scientifica di Alberto Franzoni. [The scientific activity of Alberto Franzoni.] Boll. Soc. Ticinese Sci. Nat. **1919**: 11-18. 1919.—An address delivered at Locarno on November 19, 1916, is here reported. The speaker calls attention to the important work of Alberto Franzoni as a botanical explorer in southern Switzerland and gives a description of his herbarium. The latter contains about 5500 phanerogams and over 1000 cryptogams, the mosses being particularly well represented.—*A. W. Evans*.

1722. JOHNSON, D. S. The Cinchona tropical botanical station again available. Science **51**: 235-236. 1920.

1723. KILLERMANN, S[EBASTIAN]. Von einigen peruanischen Neueinführungen in unseren Gärten um 1600. [Regarding some Peruvian introductions into our gardens about 1600.] Naturwiss. Wochenschr. N.F., **19**: 369-373. 1920.—The sun flower (*Helianthus annuus* L.), four o'clock (*Mirabilis jalapa* L.), and passion flower (*Passiflora* sp.)—*Neil E. Stevens*.

1724. KILLERMANN, S[EBASTIAN]. Zur älteren Geschichte der Orchideen. [On the early history of the orchids.] Naturwiss. Wochenschr. N.F., **19**: 351-357. 1920.—Early literature on orchids is cited. The discussion deals with the classification rather than the culture or introduction of these plants.—*Neil E. Stevens*.

1725. KÜSTER, ERNST. Albertus Magnus und Goethe. Naturwissenschaften **6**: 137-139. 1918.—Goethe's debt to the writings of Albertus de Bollstadt, or Albertus Magnus (13th century).—*Neil E. Stevens*.

1726. KÜSTER, ERNST. Einige alte Gallenbilder. [Some ancient illustrations of galls.] Naturwiss. Wochenschr. N.F., **18**: 766-769. *Fig. 1-3.* 1919.—Three figures of galls on *Quercus* originally published in the 15th and 16th centuries, are reproduced and discussed.—*Neil E. Stevens*.

1727. KÜSTER, ERNST. Georg Klebs (1857-1918). *Naturwissenschaften* 6: 681-683. 1918.—Outline of life and estimate of scientific work.—*Neil E. Stevens*.

1728. LAING, E. V. Trees in myth and legend. *Trans. Roy. Scottish Arboric. Soc.* 34: 195-209. 1920.—The article discusses the attitude of our ancestors and the ancients toward trees and the effect which trees had on the general trend of the lives of men; and deals in a general way with a few myths and legends about trees.—*C. R. Tillotson*.

1729. LONGO, BIAGIO. In memoria del Dott. Martino Savelli. *Bull. Soc. Bot. Ital.* 1919: 1-2. 1919.—Born Jan. 10, 1884; died Dec. 28, 1918. A brief note with list of 12 titles, chiefly mycological, published by Savelli.—*M. F. Warner*.

1730. LOYER, MAURICE. Henri Hua (1861-1919). *Bull. Soc. Nat. Acclim. France* 66: 161-163. 1919.—Brief obituary notice and personal appreciation.—*Neil E. Stevens*.

1731. MACOUN, W. T. [R. B. Whyte.] *Proc. Amer. Soc. Hort. Sci.* 15: 116. *Portrait*. 1918.—R. B. Whyte of Ottawa died Apr. 15, 1918. His garden contained the finest collection of herbaceous perennials in Canada, possibly in all America. He originated the Herbert raspberry in 1887, and was specially interested in the English gooseberry, having tested over 100 varieties. He had a large herbarium.—*M. F. Warner*.

1732. MANETTI, CARLO. Italo Giglioli. *Agric. Coloniale* 14: 401-404. *Portrait*. 1920.—An agricultural chemist and economist, born at Genoa, May 1, 1852, and died Oct. 1, 1920. A personal appreciation, with list of some 63 works, published between 1878 and 1918. [See also *Bot. Absts.* 8, Entry 1748.]—*M. F. Warner*.

1733. MARSHALL, L. B. L'horticulture antique et le poème de Columelle (*De re rustica* livre X). Thèse accepté pour le doctorat de l'Université de Paris. [Ancient horticulture and the poem of Columella (*De re rustica* liber X.) Doctorate thesis, University of Paris.] Hachette et Cie.: Paris, 1918.—See *Bot. Absts.* 8, Entry 1689.

1734. MARZELL, HEINRICH. Ueber Alter und Herkunft deutscher Pflanzennamen. [On the age and origin of German plant names.] *Naturwiss. Wochenschr. N.F.*, 19: 641-645. 1920.—A somewhat popular discussion of the etymology of over 200 plant names.—*Neil E. Stevens*.

1735. MATTIROLO, ORESTE. P. A. Saccardo. *Bull. Soc. Bot. Ital.* 1920: 2-3. 1920.—A brief eulogy of Saccardo by the president of the Italian botanical society. [See also *Bot. Absts.* 8, Entries 1791, 1797.]—*M. F. Warner*.

1736. MATTIROLO, ORESTE. Saverio Belli. *Bull. Soc. Bot. Ital.* 1919: 21-22. 1919.—Saverio Belli was born at Domodossola May 25, 1852 (incorrectly printed 1892), and died April 7, 1919.—*Neil E. Stevens*.

1737. MERRILL, E. D. Page-heading of periodicals. *Jour. Botany* 56: 189. 1918.—In recent volumes of the Philippine Journal of Science there is printed "on alternate pages the title of the publication and title of article with name of the author, supplemented by the volume, number, and year." The upper right-hand corner of each new article bears the name of the publication, volume, year, and number.—*Neil E. Stevens*.

1738. MOLISCH, HANS. Goethe, Darwin und die Spiraltendenz im Pflanzenreich. [Goethe, Darwin, and the spiral tendency in the plant kingdom.] *Naturwiss. Wochenschr. N.F.*, 19: 625-629. *Fig. 1-3*. 1920.—A popular discussion of the subject, with some citations of literature, including the work of the two authors named in the title.—*Neil E. Stevens*.

1739. MOLL, J. W. In memoriam Dr. S. H. Koorders. *Nederland. Kruidk. Arch.* 1919: 73-76. 1920.—Brief summary of Koorders' work, especially on the herbarium of woody plants of Java, numbering over 1100 species.—*M. F. Warner*.

1740. MONTMARTINI, LUIGI. Giuseppe Cuboni. Riv. Patol. Veg. 10: 117-118. 1920.—Prof. Giuseppe Cuboni, director of the experiment station of vegetable pathology, died suddenly in Rome on Nov. 3, 1920. He was born at Modena in 1852. [See also Bot. Absts. 8, Entry 1763.]—*F. M. Blodgett.*

1741. MORSTATT, H. Die Entwicklung der Pflanzenpathologie und des Pflanzenschutzes. [The development of plant pathology and plant protection.] Naturwiss. Wochenschr. N.F., 19: 817-822. 1920.—Some of the more important steps in the development of plant pathology in Germany and the U. S. A. are mentioned, with somewhat briefer reference to other countries. The various organizations and conferences which have contributed to the advancement of the international study of plant disease problems are mentioned. In conclusion, the interrelation of pathology, morphology, and physiology is pointed out.—*Neil E. Stevens.*

1742. MURRILL, W. A. The fruit-disease survey. Mycologia 13: 50-53. Pl. 3. 1921.—An account of the field meeting of phytopathologists in Virginia, West Virginia, Maryland, and Pennsylvania during the first week in August, 1920, for the study of fruit diseases. This meeting was of an international character, and was attended by Mr. W. B. Brierley of England, Mr. E. Foëx of France, and Mr. Rosatti of Italy.—*H. R. Rosen.*

1743. MURRILL, W. A. George Francis Atkinson. Jour. New York Bot. Gard. 19: 314-315. 1918.—Note of death on Nov. 14, 1918. [See also Bot. Absts. 8, Entry 1803.]—*Neil E. Stevens.*

1744. PAMPANINI, RENATO. Odoardo Beccari. Agric. Colon. 14: 449-453. 1920.—Beccari died at Florence Oct. 26, 1920, at the age of 77. From 1864 to 1880 he was chiefly engaged in exploration: With Doria in Borneo; in Eritrea; in New Guinea with D'Albertis; and in Sumatra. He had already published some results of his earlier travels, and in 1868 founded the Nuovo Giornale Botanico Italiano, to which he made numerous contributions. Upon his return to Italy in 1880 he devoted himself to his vast botanical collections, publishing his Malesia in 3 great volumes, with many monographic works on his special subject of palms, of which the 4 folio volumes in the Annals of the Calcutta Botanic Garden are the most important. He helped to establish the Istituto Agricolo Coloniale Italiano, at Florence. His botanical collections are in Florence, at the Istituto di Studi Superiore.—*M. F. Warner.*

1745. PANTANELLI, ENRICO. [C. A. Timiriazeff.] Riv. Biol. 2: 442. 1920.—Timiriazeff's death was announced in Nature, June 3, 1920. He was born in 1843 and was well known for his popular scientific works, several of which passed through many Russian editions, while others were translated into English. His experimental researches were summarized in a lecture before the Royal Society of London in 1903, on The Cosmical Function of the Green Plant.—*M. F. Warner.*

1746. PANTANELLI, ENRICO. Giuseppe Severini. Ann. Botanica 15: 54-56. Portrait. 1920.—Severini was born June 17, 1875; died April 17, 1918. A chronological list of his publications, 14 in number, comprises contributions on root bacteria, plant diseases, and plant nutrition, and papers on the fungi of Perugia.—*M. F. Warner.*

1747. PANTANELLI, ENRICO. Wilhelm Pfeffer (1845-1920). Riv. Biol. 2: 329-331. Portrait. 1920.—Summary and appreciation of Pfeffer's work in botany. [See also Bot. Absts. 8, Entries 1753, 1758.]—*M. F. Warner.*

1748. PARIS, GIULIO. Italo Giglioli. Riv. Biol. 2: 696-704. Portrait. 1920.—Giglioli died Oct. 1, 1920. He was born May 1, 1852, the son of Giuseppe Giglioli and Elena Hillyer of Blackheath (London). The article discusses his work as a teacher of agricultural chemistry at the Scuola Superiore di Agricoltura of Portici and at the University of Pisa; and his ability as an organizer and director of research. He was instrumental in establishing experimental

fields, on the Rothamsted plan, at Suessola, where a great number of experiments with different cereals were carried out between 1887 and 1904. His biological work was wholly concerned with plant production, and he was greatly interested in agricultural education and organization, and economics. During the war he threw himself ardently into the solution of various economic problems, and wrote much in the way of propaganda.—*M. F. Warner.*

1749. PAYNE, C. H. *Le chrysanthème en Chine.* *Le Chrysanthème* 24: 70-73, 88-89. 1920.—Reprint of original French text of the account of the chrysanthemum from *Mémoires concernant l'histoire &c. des Chinois*, Vol. 1, 1778, together with comment thereon in *Gardeners' Chronicle*, Dec. 14, 1918. [See also *Bot. Absts.* 8, Entry 891].—*Neil E. Stevens.*

1750. PAYNE, C. H. Did the tulip mania ever reach Italy? *Garden* 83: 528. 1919.—Although Italian floricultural literature of the 17th century shows that the tulip was much grown and highly esteemed, there is no evidence that the mania in its violent form ever extended to Italy. [See also *Bot. Absts.* 8, Entry 848].—*Neil E. Stevens.*

1751. P[AYNE], C. H. M. Anatole Cordonnier. *Gard. Chron.* III, 68: 246. 1920.—Cordonnier, who died at Turcoing, Nov. 3, 1920, in his 78th year, founded important nurseries at Bailleul, which were utterly destroyed by the fighting in that region during the war. During his earlier career he made a specialty of growing chrysanthemums, and published 2 small books on the subject, as well as others on fruit culture under glass.—*M. F. Warner.*

1752. PAYNE, C. H. A rare old gardening book. *Garden* 84: 357. 1920.—The Orchard and the Garden, published in London, 1602, does not appear to be mentioned anywhere save in Mrs. Cecil's History of Gardening. Is it possibly a reprint of some earlier publication? It is unlikely that Lawson's New Orchard and Garden is a reprint of this work, as Lawson's book was first published in 1597.—*M. F. Warner.*

1753. P[EARCE], G. J. Wilhelm Pfeffer. *Science* 51: 291-292. 1920.—A sketch of the life of Wilhelm Pfeffer (1845-1920) pioneer plant physiologist and professor at Leipzig for over thirty years, by one of his American students.—*Neil E. Stevens.*

1754. PHILLIPS, E. P. The importance of a properly equipped state herbarium to an agricultural country. *South African Jour. Nat. Hist.* 2: 18-39. 1920.—Shows how systematic botany is fundamental to research—the need of a collection of specimens for reference and comparison—importance of preserving economic species as a mere matter of record—need of careful determination of host-plants in the study of phytopathological problems. A number of references on economic botany and the organization and work of botanical institutions are appended.—*M. F. Warner.*

1755. PIROTTA, ROMUALDO. Pasquale Baccarini (5 aprile 1858—24 luglio 1920). *Nuovo Gior. Bot. Ital. N.S.*, 26: 235-244. *Portrait.* 1919 [1920].—Baccarini's genius for organization was shown at the Botanical Institute of Florence, where he carried on the work begun by Mattiolo. One of his great achievements was the establishment of the colonial herbarium at Florence. A list of 132 publications by him shows the diversity of his interests,—pathological, floristic, morphological, and historical.—*M. F. Warner.*

1756. PITTIER, HENRI. La evolución de las ciencias naturales y las exploraciones botánicas en Venezuela. [The evolution of natural science and botanical exploration in Venezuela.] *Suplemento del No. 14 de "Cultura Venezolana."* 28 p. *Tip. Cultura Venezolana: Caracas*, 1920.—A series of lectures entitled *Botánica y Biología*, by Dr. DIEGO CARBONELL, takes up the evolution of natural history in Venezuela, distinguishing 3 periods: (1) That influenced by Humboldt; (2) the experimental period, influenced by Vargas; and (3) the "doctrinary" period of Ernst and Villavicencio. Pittier differs with this classification, maintaining that such periods involve great leaders, such as Darwin, Haeckel, or Candolle, who have been lacking in Venezuela, and that botany is still in the exploration and collecting stage there, while agriculture has also made little progress. He takes up the botanical explorers of Vene-

zuela chronologically, beginning with PETER LOEFLING, who collected in 1754, N. J. VON JACQUIN, HUMBOLDT, SCHOMBURGK, KARSTEN, PREUSS, and others, and concludes the work with a short bibliography on Venezuelan botany.—*P. G. Russell.*

1757. PRAIN, DAVID. Anne Casimir Pyramus de Candolle. *Proc. Linn. Soc. London* **131**: 51–52. 1919.—Personal appreciation of Casimir de Candolle, born Feb. 26, 1836, died Oct. 3, 1918.—*M. F. Warner.*

1758. PRINGSHEIM, HANS, UND E. G. PRINGSHEIM. Wilhelm Pfeffer. *Ber. Deutsch. Chem. Ges.* **53**: 36–39. 1920.—Obituary of Pfeffer (born March 9, 1845), with an estimate of his work as a physiologist.—*Neil E. Stevens.*

1759. R[AMSBOTTOM], J[OHN]. John Snell. *Jour. Botany* **58**: 158. 1920.—John Snell, whose death occurred at Preston, April 19, 1920, in his 42d year, was known in connection with the Ormskirk potato trials, testing varieties with reference to wart disease (*Chrysophlyctis endobiotica*).—*M. F. Warner.*

1760. REDDICK, D. New abstract journal. *Phytopathology* **11**: 29. 1921.—The appearance of *Zentralblatt für die gesamte Landwirtschaft mit Einschluss der Forst- und Teichwirtschaft, der Tier-Pathologie, und Medizin* from the press of Gebrüder Borntraeger, Berlin, is noted.—*B. B. Higgins.*

1761. RIDDELL, W. R. The pharmacopoeia of another botanical physician. *Trans. and Proc. Bot. Soc. Edinburgh* **28**: 1–23. 1920.—Plants employed by Samuel B. Emmons in his *Vegetable family Physician* (Boston, 1836).—*M. F. Warner.*

1762. RITTER, GEORG. Friedrich Ludwig. *Beih. Bot. Centralbl.* **36** (I. Abt.): 133–134. 1919.—Friedrich Ludwig was born Oct. 24, 1851, died July 22, 1918.—*Neil E. Stevens.*

1763. RIVERA, VINCENZO. Giuseppe Cuboni. *Riv. Biol.* **2**: 693–696. *Portrait.* 1920.—Cuboni was born at Modena Feb. 2, 1852, and died at Rome, Nov. 3, 1920. He brought a broad culture and enthusiasm to the solution of agricultural problems, and was instrumental in the development of many economic projects. His immediate personal researches were chiefly along phytopathological lines, and he stimulated valuable work on the part of his associates.—*M. F. Warner.*

1764. [ROBERTS, J. W.] Dr. S. M. McMurran. *Amer. Nut. Jour.* **13**: 71. 1920.—Stockton Mosby McMurran, born March 8, 1887; died September 5, 1920. Several of his phytopathological articles are noted.—*M. F. Warner.*

1765. ROBERTS, W. American plants in England. *Gard. Chron.* **III**, **67**: 52. 1920.—Advertisements of seeds and plants, chiefly from newspapers. An anonymous communication in *Gentleman's Magazine*, Dec. 1751, is mentioned, concluding with *Seeds Arrived this Year from our North American Colonies*, an extensive list quoted in full, under vernacular names probably at that time in use in North America, comprising trees, ornamental shrubs, and vines. Particular mention is made of a 12-page catalogue of William Wright of Edinburgh, advertising American trees collected in Canada by his brother John, who was said to have previously printed at London a catalogue comprising nearly 600 different kinds; but this has not been traced. Other London seedsmen offering American plants and seeds are mentioned. The most popular plant imported seems to have been the American aloe.—*M. F. Warner.*

1766. ROBERTS, W. A forgotten botanical artist: Miss Crabtree. *Gard. Chron.* **III**, **67**: 278. 1920.—Drawings made in the 18th century by Philippa Crabtree, who may have been the child of this name, born to John and Philippa Crabtree, Nov. 17, 1764. She sent to the Royal Academy in 1786 and 1787 three exhibits entitled "Flowers from Nature." Query: Is it not likely that she drew some of the unsigned plates in early volumes of the *Botanical Magazine*? Drawings by MARY ANN and ELIZABETH CRABTREE, 1816 to 1822, are also noted.—*M. F. Warner.*

1767. ROBERTS, W. Some little known botanists. *Gard. Chron.* III, 65: 147. 1919.—Eighteenth century medical men, gleaned from Musgrave's Obituary, and either not found or incompletely treated in Britten and Boulger's Biographical Index of British and Irish Botanists, are mentioned. Considerable data are given on Thomas Clarke, prominent in Jamaica affairs from 1774 to his death in 1792; Edwin Sandys of Wadham College (died 1731?), Thomas Brisbane (died 1742), James Newton (died 1750), Richard Kentish (died 1792), and many others are mentioned.—*M. F. Warner.*

1768. ROPER, I. M. Edward Baylis's "Botanic Physic." (Bibliographical notes. LXX.) *Jour. Botany* 56: 52-54. 1918.—A quarto volume of 563 pages with 41 full-size copper plates of medicinal plants, by Edward Baylis M.D., issued in parts during 1791 and 1792. The work is very rare and no information about the author can be traced.—*Neil E. Stevens.*

1769. SCHENCK, HEINRICH. Martin Schongauer's Drachenbaum. [The dragon tree of Schongauer.] *Naturwiss. Wochenschr.* N.F., 19: 775-780. 1 fig. 1920.—The dragon tree (*Dracaena Draco*) is found in a copperplate of the "Flight into Egypt" engraved by Martin Schongauer about 1469-1474, over 100 years before the first botanical description and illustration by Clusius. Schongauer could not have drawn his plant from a printed description, as earlier works do not treat of it, while the Herbarius (1484) and Herbarium Apuleji Platonici (1480) had not yet been printed; moreover, the accuracy of the drawing shows that it could only have been made from the living tree. Little is known of Schongauer's life, but he had probably visited southern Spain or Portugal, whither the dragon tree must have been brought by voyagers to the Canaries as early as the middle of the 14th century, as evidenced by very ancient specimens recorded from Cadiz and Lisbon. Schenck further shows that Schongauer's drawing is not only the earliest known representation of the dragon tree, but was evidently the prototype of those found in the work of Dürer, Burgmair, Bosch, Juppe, and Grüninger.—*M. F. Warner.*

1770. SCHIPS, M. Die Idee von Typus und ihre Bedeutung für Morphologie und Systematik. [The idea of "type" and its significance in morphology and taxonomy.] *Naturwiss. Wochenschr.* N.F., 18: 401-407. 1919.—A discussion of the development of the 2 opposed philosophical conceptions of the "type," or model, on which living things were created. The realistic, which held that a material type existed and might be found; and the idealistic, which held that the "type" existed only in the mind of the creator. This has, of course, no reference to modern discussions of nomenclatorial type.—*Neil E. Stevens.*

1771. SCHUSTER, JULIUS. Die Dokumenten-Sammlung Darmstaedter der Preussischen Staatsbibliothek und ihre Bedeutung als historisches Archiv für Naturwissenschaften und Medizin. [The Darmstaedter document collection of the Prussian state library and its importance as source for the history of natural science and medicine.] *Naturwiss. Wochenschr.* N.F., 19: 707-710. 1920.—Some of the more important sources to be found in this library are indicated and the importance of research in the history of science is emphasized.—*Neil E. Stevens.*

1772. S[corr], D. H. Edward Alexander Newell Arber. *Proc. Linn. Soc. London* 131: 39-48. 1919.—Biographical sketch of Newell Arber (1870-1918), and outline of his scientific work with particular reference to paleobotany. A chronological list (1899-1918), prepared by his wife, of 82 books and papers is appended. [See also *Bot. Absts.* 8, Entry 1643.]—*M. F. Warner.*

1773. SCOTT, D. H. The late Ethel Sargent. *Jour. Botany* 56: 115-116. 1918.—Miss Sargent was distinguished for her researches in cytology and in the comparative anatomy of seedlings. [See also *Bot. Absts.* 5, Entry 72.]—*Neil E. Stevens.*

1774. SEWARD, A. C. Reginald Philip Gregory. *Nature* 102: 247-248. 1918.—R. P. Gregory (1879-1918) was a "good all-round botanist," whose contributions to the knowledge of the genetics and cytology of giant races of *Primula* were of special interest. [See also *Bot. Absts.* 5, Entry 1234; 8, Entry 830.]—*Neil E. Stevens.*

1775. S[KAN], S. A. **A. H. Hildebrand.** Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 32-33. 1918.—Arthur Hedding Hildebrand, C.I.E., whose death at the age of 65 is announced in *The Times* of January 7, introduced a number of interesting plants to cultivation, among others the remarkable *Lonicera Hildebrandiana*. He also experimented with the cultivation of English roses and strawberries in Burma, where he spent over 30 years as administrator.—*M. F. Warner*.

1776. S[KAN], S. A. **Lady Barkly's drawings of orchids.** Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 342. 1918.—A collection recently presented to the Kew herbarium, comprising 51 orchids of British Guiana, and 7 from Jamaica, drawn from nature by Lady Barkly while her husband, Sir Henry Barkly, was governor of British Guiana, 1848-53, and of Jamaica, 1853-56. She died at Melbourne, Apr. 17, 1857. The collection also includes 66 drawings of Cape plants, mostly drawn by her daughter, Miss E. B. Barkly.—*M. F. Warner*.

1777. SMITH, H. I. **James M. Macoun.** *Science* 51: 478-480. 1920.

1778. SPRENGER. **Karl Sprenger.** *Mitteil. Deutsch. Dendrol. Ges.* 27: 354-356. *Portrait*. [1918?].—Born in Schwerin. After the Franco-Prussian war he had gone to Italy, and developed a garden at Vomero, near Naples, whence he introduced and distributed plants from all over the world. He travelled extensively in Spain in search of choice plants, and wrote many botanical papers. He died at Corfu in December, 1917.—*M. F. Warner*.

1779. STEFFEN, ALEXANDER. **Aus der Geschichte der Garten-Aurikeln.** [Bits of Auricula history.] *Gartenflora* 69: 113-115. 1920.—The vogue of this flower toward the end of the 18th century is recalled, and Neuenhahn's *Annalen der Gärtnererey*, which was largely devoted to it, and F. A. Kanngiesser's *Aurikelflora* are mentioned.—*M. F. Warner*.

1780. STEVENS, N. E. **The botany of the New England poets.** *Sci. Monthly* 12: 137-149. 1921.—Quotations are given from Longfellow, Whittier, Emerson, Holmes, and Lowell, showing their knowledge of plants.—*L. Pace*.

1781. STOPES, M. C. **A new monthly botanical journal.** *Sci. Prog.* [London] 13: 457. 1919.—A brief statement is given regarding the inauguration and scope of *Botanical Abstracts*.—*J. L. Weimer*.

1782. SYDOW, H. **Ferdinand Theissen, S. J.** *Ann. Mycol.* 17: 134-139. 1919 [1920].—An appreciation, with brief biography, of Ferdinand Theissen (1877-1919). A bibliography of his 52 mycological contributions is appended.—*H. S. Jackson*.

1783. TEALL, GARDNER. **Collecting old-time garden books.** *House and Garden* 37⁶: 34-35, 68. *Illus.* 1920.—Virgil, Crescenzi, early English authors such as Plat and Worlidge, Evelyn's *Sylva*, *Kalendarium*, and translation of La Quintinye, and the Scot's Gardner of John Reid are mentioned; also early American works, such as Totler's *Almanac for South Carolina*, 1752, with its garden calendar, Squibb's *Gardener's Calendar*, 1787, and John Allen's *The Husbandman's Guide*, Boston, 1712. Two of the illustrations are incorrectly labelled; the portrait of "Remberti," i.e., Rembert Dodoens, could not have appeared in a 15th century book, since Dodoens was born in 1517, while "Andreas Gerardus" is a fictitious name, possibly intended for John Gerarde, though the portrait is probably one of Matthiolus.—*M. F. Warner*.

1784. THAXTER, ROLAND. **William Gilson Farlow.** *Amer. Jour. Sci.* 49: 87-95. *Portrait*. 1920.—Doctor Farlow was born Dec. 17, 1844, died June 3, 1919. Since 1870 he held a position in Harvard University, the greater portion of the time as Professor of Cryptogamic Botany. The article contains the outstanding incidents of Doctor Farlow's life and an appreciation of his work. [See also Bot. Absts. 6, Entries 916, 947, 956, 963, 1463, 1470; 7, Entry 1593; 8 Entries 833, 1682, 1785.]—*T. J. Fitzpatrick*.

1785. THAXTER, ROLAND. William Gilson Farlow. *Bot. Gaz.* 69: 83-87. *Portrait*. 1920.—A biographic sketch. [See also preceding Entry.]—*H. C. Cowles*.

1786. THOMPSON, H. S. Curtis's *Botanical magazine*. Garden 83: 576. 1919.—The author concerns himself with discrepancies in dates of early volumes.—*Neil E. Stevens*.

1787. THORPE, T. E. Armand Gautier. *Nature* 106: 85-86. 1920.—Emile Justin Armand Gautier, distinguished for his investigations in many branches of chemistry, was known to botanists for his work in plant biochemistry, especially concerning the "chemical transformations of various products in the life-history of vegetable organisms."—*Neil E. Stevens*.

1788. TIMM, R. Zum achtzigsten Geburtstage Warnstorf's. [Warnstorf's eightieth birthday.] *Hedwigia* 60: 50-53. 1918.—An appreciation of the botanical work of Carl Warnstorf (born December 2, 1837) especially in the field of bryology.—*Neil E. Stevens*.

1789. TONI, G. B. DE. Commemorazione dei soci defunti G. Briosi e P. Baccarini. *Bull. Soc. Bot. Ital.* 1919: 59-62. 1919.—In memory of the deceased members Giovanni Briosi (1846-1919), and Pasquale Baccarini (1858-1919).—*Neil E. Stevens*.

1790. TONI, G. B. DE. [Lucio Gabelli.] *Bull. Soc. Bot. Ital.* 1918: 54-55. 1918.—Gabelli died Sept. 7, 1918. A brief note on his botanical work, most important being his study of the Gnetaceae.—*M. F. Warner*.

1791. TRAVERSO, G. B. Pier Andrea Saccardo. *Riv. Biol.* 2: 145-148. *Portrait*. 1920.—Saccardo was born April 23, 1845, died February 11, 1920. His work as a mycologist is outlined, and there is brief mention of his interest in botanical history, which resulted in such books as his *La Botanica in Italia* (2 Vol., 1895, 1902) and *La Cronologia della flora Italiana* (1909).—*M. F. Warner*.

1792. TRUE, R. H. Beginnings of agricultural literature in America. *Bull. Amer. Library Assoc.* 14: 186-194. 1920.—Some data are to be found in narratives of early European explorers, the voyage of Captains Amadas and Barlowe, and Peter Martyr's *Decades of the Newe World*; those of the first colonists, John Smith in Virginia, Bradford and Winthrop in Massachusetts, and for the French provinces the *Jesuit Relations*. To the succeeding period of colonial expansion and freer communication with Europe belong John Clayton's *Letter on Virginia* (1688), Josselyn's *Voyages*, Francis Moore's *Voyage to Georgia* (1744), and Kalm's *Travels into North America*. About this time began the first definitely agricultural publications, of which Jared Eliot's *Essay upon Field-Husbandry in New England* (1748), with its continuations, may be considered the most important American agricultural writing of the colonial period. Following the Revolution, a number of works of the most practical and experimental character were published by John Beale Bordley, and during this time also appeared Deane's *New England Farmer*, a typical agricultural dictionary. This was also the time of the rise of agricultural societies in South Carolina, Pennsylvania, Massachusetts and New York; their papers were at first usually printed in the newspapers, and the first volume from such a source was published by the Massachusetts Society for Promoting Agriculture in 1799. The first distinctly agricultural periodical in the country was the *Agricultural Museum* (Georgetown, D. C., 1810), while the *American Farmer* was founded by Skinner in 1819.—*M. F. Warner*.

1793. TURRILL, W. B. The Rev. H. F. Tozer and plants collected by him in the nearer East. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1920: 29-31. 1920.—The Rev. H. F. Tozer was born in 1829 and died June 2, 1916. He travelled extensively, especially in Greece and the old Turkish Empire, and wrote many books and articles on these regions. Some of his plants, which have recently been presented to Kew, are from localities little known to botanists.—*M. F. Warner*.

1794. UNITED STATES. 66TH CONGRESS, 2D SESSION. JOINT COMMITTEE ON THE LIBRARY. Hearing on S. 497, a bill to increase the area of the United States botanic garden in the city of Washington, District of Columbia, and S. Res. 165, directing the committee on the District of Columbia to report plans for the creation in or near the District of Columbia of a botanic garden comparable with the best existing botanic gardens. Part 1-2. 58 + v + 59-152 p., 4 maps. Government Printing Office: Washington, 1920.—Part 1, Committee hearings, is devoted to testimony of experts on the requirements and possibilities of botanic gardens. Part 2 includes extracts from numerous publications on botanic gardens and their functions, a compilation of statistics in regard to existing gardens, and a list of references to literature on the subject, together with a history of the present garden in Washington.—*M. F. Warner.*

1795. VAUGHAN, JOHN. *The music of wild flowers.* 181 p. E. P. Dutton & Co.: New York, 1920.—A collection of essays, most of which have some bearing on the British local flora, but the 1st, which gives title to the volume, is on the recreation a number of distinguished men have found in field botanical study: The philosophers Rousseau and John Stuart Mill; the poets Gray, Crabbe, and Tennyson; Charles Kingsley; Prof. Hort, the Greek scholar; and Edward Cowell, professor of Sanskrit at Cambridge. The 2nd essay, *An Old Herbal*, describes the first edition of Fuchs' *History of Plants* (Basle, 1542), and especially the copy belonging to the library of Winchester Cathedral, in which the English names have been written beneath each plant, evidently by a competent botanist, and in all probability soon after the publication of the work. It is suggested that this copy of Fuchs may have originally been owned by John Warner, a prebendary of the Cathedral from 1549, Dean of Winchester from 1559 until his death in 1564, and a physician as well as a clergyman. His interest in botany is evident from the fact that 2 other botanical books in the Cathedral library contain his name.—*M. F. Warner.*

1796. VAUPEL, FRIEDRICH. *Aus der alten Kakteenliteratur.* Monatsschr. Kakteenk. 27: 83-85, 104-107, 113-116, 129-132, 141-146. 1917; 28: 53-54, 71-72, 105-108, 124-126, 136-138. 1918; 29: 25-31, 49-54, 61-66, 115-120, 127-128, 140-144. 1919.—Reprints of diagnoses, descriptions of plates, and a few other notes from the following: Salm-Dyck, *Observationes botanicae in horto Dickensi notatae* (1822); Candolle, *Catalogus plantarum horti botanici Monspeliensis* (1813); Plumier, *Plantarum americanarum fasciculus octavus* (1758); Oviedo, *Coronica delas Indias*; Lobel, *Plantarum seu stirpium historia*; Mattioli, *Commentarii in sex libros Pedacii Dioscoridis Anazarbei de medica materia*; Acosta, *Historia natural y moral de las Indias*.—*M. F. Warner.*

1797. VUILLEMIN, PAUL. Émile Boudier (1828-1920)—Pier Andrea Saccardo (1845-1920). *Rev. Gén. Sci. Pures et Appl.* 31: 233-234. 1920.—The deaths of 2 great leaders in mycology are recorded.—*M. F. Warner.*

1798. WARNER, H. H. *A garden in the sixteenth century.* *Garden* 84: 321. 1920.—Garden of the rectory in the little village of Bishopsbourne near Canterbury, which remains today very much as "the learned and judicious" Richard Hooker, rector from 1595 to 1600, made it.—*M. F. Warner.*

1799. WARNER, H. H. *Shakespeare and the garden.* *Garden* 84: 406-407. *Fig.* 1920.—Chiefly quotations from Shakespeare relating to flowers and gardens; the number of plants mentioned by him is said to be about 150.—*M. F. Warner.*

1800. WARNER, M. F. *Exostemma Sanctae Luciae.* *Jour. Botany* 56: 55. 1918.—A communication read before the American Philosophical Society February 20, 1784, though not printed until 1786, includes a popular description of the plant by George Davidson, under the name *Cinchona Caribaea Sanctae Luciae*.—*Neil E. Stevens.*

1801. WARNER, M. F. *The literature of horticulture.* *Library Jour.* 44: 766-776. 1919.—Paper presented at Agricultural Libraries Section, American Library Association, Asbury

Park, June 26, 1919, under title: Bibliographical Opportunities in Horticulture. [See Bot. Absts. 8, Entry 918].—*Neil E. Stevens.*

1802. WARNER, M. F. A Virginia garden in 1774. *Jour. Internat. Garden Club* 3: 191-195. 1919.—Extracted with running comment from the diary of PHILIP VICKERS FITHIAN, while tutor at Nomini Hall, Westmoreland County, Virginia. His observations on garden plants and operations, and miscellaneous details of agricultural practice in that locality, together with some notes on climate and times of flowering and fruiting are covered.—*M. F. Warner.*

1803. WHETZEL, H. H. George Francis Atkinson. *Guide to Nature* 12: 70-72. *Portrait.* 1919.—Popular account of Atkinson as mycologist.—*Neil E. Stevens.*

1804. WHETZEL, H. H., and H. B. HUMPHREY. Frederick Kølpin Ravn. *Phytopathology* 11: 1-5. *Portrait.* 1921.—A brief biographical sketch and appreciation.—*B. B. Higgins.*

1805. WILCOX, E. M. Harvey Elmer Vasey. *Phytopathology* 9: 299-300. *Portrait.* 1919.—A sketch of H. E. Vasey (1890-1918).—*Neil E. Stevens.*

1806. W[ILLIS], J. C. Dr. Alberto Löfgren. *Proc. Linn. Soc. London* 131: 57-58. 1919.—He was born in Stockholm Sept. 1854, and studied at the University of Upsala, but accompanying the Regnell expedition to southern Brazil in 1874, he remained in that country all his life, dying at Rio de Janeiro Aug. 30, 1918. His publications are comparatively few, though he had the most complete knowledge of the Brazilian flora of any botanist of his time. His collections are mostly at Sao Paulo and at Rio de Janeiro, with duplicates at Copenhagen, Stockholm, Berlin, and the Glaziov collection.—*M. F. Warner.*

1807. WILSON, W. F. David Douglas, botanist at Hawaii. 83 p., *illus. (including portraits).* Honolulu, 1919.—Reprint of various materials relating to Douglas (1798-1834).—*Neil E. Stevens.*

1808. WOODRUFF, L. L. History of biology. *Sci. Monthly* 12: 253-281. 1921.—Biology as the science of life really had its beginnings with the Greeks. Aristotle, Theophrastus, Hippocrates, Dioscorides, Pliny, van Leeuwenhoek, Malpighi, Grew, Linnaeus, Harvey, Cuvier, Huxley, Agassiz, Weismann, Mendel, Darwin, Gray, and many others are characterized in a few incisive statements.—*L. Pace.*

1809. ZIRPOLO, G. Michele Geremicca. *Riv. Biol.* 2: 704-706. *Portrait.* 1920.—An outline of the life and botanical work of Geremicca, who was born in Naples Nov. 9, 1857, and died there June 17, 1920. He published many works, chiefly on morphology and physiology, and was also greatly interested in the history of Italian botanists, publishing in the *Bullettino della Società dei Naturalisti* a few chapters of a systematic index to botanical literature.—*M. F. Warner.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 1892, 1926, 2141, 2231)

1810. ANONYMOUS. Museums in education. *Nature* 106: 269-270. 1920.—An editorial on the Final Report of Committee, British Association, Section L (Cardiff, 1920). The suggestion is endorsed that there be a central council to aid in the inception of museums and to coordinate their work when established.—*O. A. Stevens.*

1811. ANONYMOUS. Programma onderwijs Rijksbloembollenschool. [Educational program of the Government bulb school.] *Weekbl. Bloembollencult.* 30: 120. 1919.—The course

occupies 3 years. The main object is to develop horticulturists especially trained in bulb raising. The school is located at Lisse, Netherlands.—*J. C. Th. Uphof*.

1812. ANONYMOUS. [Rev. of: COULTER, J. M., and M. C. COULTER. *Plant genetics*. ix + 214 p. The University of Chicago Press: Chicago, 1918 (see Bot. Absts. 2, Entry 395).] *Sci. Prog.* [London] 13: 592-504. 1919.

1813. ANONYMOUS. [Rev. of: GAGER, C. S. *Fundamentals of Botany*. xix + 640 p. P. Blakiston's Son & Co.: Philadelphia, 1916, Reprinted, 1917.] *Sci. Prog.* [London] 13: 504-505. 1919.

1814. ANONYMOUS. [Rev. of English translation, by LIVINGSTON, B. E., of: PALLADIN, V. I. *Pflanzen-Physiologie*. (Plant Physiology.) xxv + 320 p. P. Blakiston's Son & Co.: Philadelphia, 1918.] *Sci. Prog.* [London] 13: 502. 1919.

1815. ANONYMOUS. [Rev. of: ROBBINS, W. W. *The botany of crop plants*. xx + 681 p. 263 fig. P. Blakiston's Son & Co.: Philadelphia, 1917.] *Sci. Prog.* [London] 13: 676-677 1919.

1816. ANONYMOUS. [Rev. of: WHITING, A. L. *Soil biology laboratory manual*. x + 143 p. John Wiley & Sons: New York; Chapman & Hall, Ltd.: London, 1917.] *Sci. Prog.* [London] 13: 505. 1919.

1817. CLUTE, WILLARD N. *Plant names and their meanings*—V. *Amer. Bot.* 27: 18-23. 1921.—The derivation of scientific and vernacular names of the Liliaceae is discussed.—*S. P. Nichols*.

1818. HELLAND-HANSEN, BJÖRN. *Den biologiske station*. [The biological station.] Bergens Mus. Aarsberetning 1918-1919: 76-77. 1919.—Annual report of activities and publications.—*A. Gundersen*.

1819. KREUTZER, E. *Zur forstlichen Hochschulfrage in der Tschecho-Slowakei*. [The question of forest colleges in Czecho-Slovakia.] *Allg. Forst- u. Jagd-zeitg.* [Wien] 38: 148-149. 1920.—The establishment of one or more agricultural colleges in Czecho-Slovakia is being considered. This leads to a discussion of forestry education in general in the old Austrian Empire and its present tendencies in the component states. In general there seems to be a tendency to start more schools than the small size of the states warrants.—*F. S. Baker*.

1820. KTK. *Der deutsche forstliche Hochschulunterricht in der Tschecho-Slowakei*. [The German forestry college instruction in Czecho-Slovakia.] *Wiener Allg. Forst- u. Jagd-zeitg.* 38: 190-191. 1920.—The German Section of the Agricultural Council for Bohemia has a project under consideration for the establishment of a forestry college in Czecho-Slovakia. There are 3 alternatives: (1) Establishment of a new school; (2) establishment of a forestry branch of some technical college, perhaps at Prague or Brunn; (3) transformation of the Higher Forest Academy at Reichstadt. The 1st plan gives the most freedom of choice as to location, etc., but is expensive. The 2nd is inexpensive and has the advantage that a portion of the faculty is already furnished; but the location in a big city is undesirable. The 3rd plan has been adopted and presented to the government. It calls for the taking over of the Reichstadt Academy, the latter to be established as an independent branch of the Prague Technical College.—*F. S. Baker*.

1821. MARTIN, JOHN N. *Botany with agricultural applications*. 2nd ed. revised, xii + 604 p., 490 fig. John Wiley & Sons, Inc.: New York, 1920.—Full title of 1st edition is "Botany for agricultural students." Much of the text is rewritten, and new and additional illustrations are used. An additional chapter on "Variations" is included. [See Bot. Absts. 3, Entries, 1920, 2165.]—*C. S. Gager*.

1822. NEEDHAM, J. G. The new wild life preserve near McLean, N. Y. *Sci. Monthly* 12: 246-252. *Fig. 1-2*. 1921.—This bog, 15 miles from Cornell University and always the object of interest and study, has recently been made into a wild life preserve and placed in the keeping of the Trustees of the Lloyd Library. A professor from one of the biological departments of Cornell University is to be custodian. The author has been designated as the first custodian. The preserve is an uncultivated area of about 100 acres. The 2 maps show the roads and houses in the vicinity, the topography, and the character of the vegetation. A fence to keep out grazing animals and signs inviting naturalists to enter for study but not for destruction are the protective measures adopted.—*L. Pace*.

1823. STEBBING, E. P. Higher forestry education for the empire. *Nature* 106: 438-440. 1920.—Discussion, relating chiefly to India, as to whether forest probationers should be trained at one central institution.—*O. A. Stevens*.

1824. VOLKEROZ, K. De opleiding tot vakondernijis in de bloembollenteelt en het tuinbou-wondernijis in de bloembollenstreek. [Professional training in bulb culture and horticultural education in the bulb district.] *Weekbl. Bloembollencult.* 30: 46-47. 1919.—A general outline is given of the horticultural education of the Government Horticultural Winter Schools and the Government Horticultural Winter Courses, especially with reference to the bulb-growing districts of the Netherlands. Winter courses (short courses) in the bulb districts are given in Bennebroek, Hillegom, Lisse, Sassenheim, and Noordwijk. A winter school is established at Lisse, also a course to train horticultural teachers in bulb raising. In the winter courses, 5 subjects are taught; in the winter schools 20 subjects, among them the English, German, and Russian languages. The winter schools and winter courses have 1768 and 300 lecture hours respectively; both courses extend over 2 years.—*J. C. Th. Uphof*.

1825. WEATHERBY, C. A. What the Latin names mean—I. *Amer. Fern Jour.* 10: 113-115. 1920.—The article consists of a list of 41 specific names, beginning with *acrostichoides* and extending through *frondosa*, with origin and meaning of each.—*F. C. Anderson*.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

(See also in this issue Entries 1904, 1945, 1946, 2148, 2195)

1826. BAILEY, I. W. The cambium and its derivative tissues. III. A reconnaissance of cytological phenomena in the cambium. *Amer. Jour. Bot.* 7: 417-434. 4 pl. 1920.—The elements of the cambium in gymnosperms and angiosperms, although they may attain a very great length (9,000 microns), are uninucleate. The sphere of influence of the nucleus must, therefore, sometimes extend for several thousand microns. The nucleo-cytoplasmic ratio in cambial initials may vary greatly but in *Pinus Strobus*, at least, the chromosome number is always constant; and in all material examined chromosome size is also essentially constant. WINKLER's conclusion that there is a close correlation between cell size and chromosomal mass evidently does not hold for the cambium. The fusiform cambial initials, which are frequently several hundred times as long as they are wide, divide longitudinally in the tangential plane, the continual increase in the periphery of the cambium not being met by radial divisions but by the cells sliding by one another. The longitudinal division takes place through an extraordinary extension of the cell plate. The spindle fibers thicken between the daughter nuclei after mitosis, producing a cell plate, and this plate is extended upward and downward from the region of the nuclei through the operation of two masses of kinoplasmic fibrillae, the kinoplasmasomes, the new wall ultimately reaching both ends of the protoplast. The author discusses the types of cell plate formation described by various authors and believes that they represent different phases or stages of a single fundamental type of cytokinesis. The significance of the cambium in the investigation of various cyto-

logical problems, particularly of those relating to the cell plate and the dynamics of cytokinesis, is briefly discussed.—*E. W. Sinnott.*

1827. BEZSSONOF, N. Erscheinungen beim Wachstum von Mikroorganismen auf stark rohrzuckerhaltigen Nährboden und die Chondriomfrage. [Phenomena occurring in the growth of microorganisms on media of high cane-sugar content and the chondriosome question.] Centralbl. Bakt. II Abt. 50: 444-464. Pl. 1. 1920.—Molds cultivated on media with high cane-sugar content reacted, from a morphological point of view, as follows: The *Aspergillus* forms, *Penicillium glaucum* Bref. (Link), *Aspergillus Oryzae*, *A. candidus*, and *A. Wentii* produce fruiting bodies in the form of incipient perithecia. *A. Wentii* differs from the others in the shape of its ascogone and in this respect approaches the characteristic type of the Erysiphaceae. *Penicillium glaucum* produces giant conidia. *P. brevicaulis*, with its characteristic mycelium, deviates further from the others in its poor growth on cane-sugar media. *Rhizopus nigricans* produces zygospores, azygospores, and chlamydospores in cane-sugar solutions; sporangia were observed only on solid media.—The following physiological and cytological observations were made: *Aspergillus Oryzae* produces true alcoholic fermentation. The formation of ethyl alcohol was demonstrated both quantitatively and qualitatively. The fungi show fine granulation of the cytoplasm even in unstained material. Bacteria and fungi stain more intensely with nuclear stains because of the dispersion of the chromatin material. The accentuated development of generative cells, on media with high sugar concentration, the dispersed condition of the cytoplasmic units as well as the state of dispersion of the chondriosomes points to an intimate relation between these phenomena.—*Anthony Berg.*

1828. COWDRY, N. H. Experimental studies on mitochondria in plant cells. Biol. Bull. [Woods Hole] 39: 188-200. 3 pl. 1920.—The author has conducted experiments on the radicles of seedling peas to determine whether mitochondria might be utilized as cytological indicators of cell activity. The conclusion is that "mitochondria are changed to an abnormal degree only under severe conditions which either kill the cell or render its recovery very improbable."—*Elda R. Walker.*

1829. DANGEARD, P. A. Observations relatives à la note precedente. [Observations regarding an earlier communication.] Compt. Rend. Acad. Sci. Paris 170: 1518. 1920.—Reference is made to the controversy between GUILLIERMOND and the author. The latter states that he still maintains his former contentions, but has nothing further to add at this time.—*C. H. Farr.*

1830. DANGEARD, P. A. Sur la métachromatine et les composés tanniques des vacuoles. [On the metachromatin and the tannin content of the vacuoles.] Compt. Rend. Acad. Sci. Paris 171: 1016-1019. 9 fig. 1920.—A study of the vacuoles of *Taxus baccata* and the effects of intravital stains indicate that the vacuoles are formed in association with metachromatin and that this material is distinct from the tannin bodies which are formed later.—*C. H. Farr.*

1831. EMBERGER, L. Étude cytologique de la Sélaginelle. [A cytological study of Selaginella.] Compt. Rend. Acad. Sci. Paris 171: 263-266. Fig. 1-6. 1920.—In the meristem and sporogenous tissues of *Selaginella* there are mitochondria of all types; plastes (one in each spore), microsomes of a lipoid nature, and a vacuolar system of unknown constitution but similar to the metachromatin of fungi. The author differs with DANGEARD on his interpretation of these bodies.—*C. H. Farr.*

1832. GUILLIERMOND, A. Nouvelles observations cytologiques sur Saprolegnia. [New observations on the cytology of Saprolegnia.] Compt. Rend. Acad. Sci. Paris 171: 266-268. Fig. 1-6. 1920.—Vacuoles are found to be formed by the fusion of anastomosing canals. The fungus contains chondriosomes, fatty globules, and a vacuolar system which is not metachromatic in nature. Author finds that it is very difficult to distinguish the chondriocontes from the bacteria which are associated with the fungus.—*C. H. Farr.*

1833. GUILLIERMOND, A. *Nouvelles recherches sur l'appareil vacuolaire dans les végétaux.* [New investigations of the vacuolar system of plants.] *Compt. Rend. Acad. Sci. Paris* 171: 1071-1074. 25 fig. 1920.—Using the roots of beans and peas and the radicles of barley to trace the development of the vacuoles, the author concludes that the latter are formed from bodies which resemble mitochondria but are not true mitochondria.—C. H. Farr.

1834. GUILLIERMOND, A. *Sur l'évolution du chondriome pendant la formation des grains de pollen de Lilium candidum.* [The transformations of the chondriosome during formation of pollen grains of *Lilium candidum*.] *Compt. Rend. Acad. Sci. Paris* 170: 1003-1006. Fig. 1-11. 1920.—Chondriosomes in presynapsis consist of granular mitochondria, rods, and chondrioconts. During synapsis numerous small granules and a few large granules appear. The latter enlarge and become darker during diakinesis. In metaphase and during the homeotypic division, rods and chondrioconts are present. During microspore formation there are small granules and large plastids that become very distinct in the later stages.—C. H. Farr.

1835. HERRERA, A. L. *Sur l'imitation des cellules, des tissus, de la division cellulaire et de la structure du protoplasma avec le fluorosilicate de calcium.* [On the imitation of cells, tissues, cell-division, and the structure of protoplasm with calcium fluorosilicate.] *Compt. Rend. Acad. Sci. Paris* 170: 1613-1614. 1920.—A confirmation of the results of GAUTIER and CLAUSMANN on the biological importance of fluorine. Structures resembling cells are produced by the diffusion of KHF_2 and $CaCl_2$ into an alkaline solution of colloidal silica.—C. H. Farr.

1836. SHARP, L. W. *Mitosis in Osmunda.* [Rev. of: DIGBY, L. *On the archesporial and meiotic phases of Osmunda.* *Ann. Botany* 33: 135-172. 5 pl. 1919 (see Bot. Absts. 3, Entry 1933).] *Bot. Gaz.* 69: 88-91. 1920.—This paper is regarded as a very complete statement of the FARMER theory of the method of chromosome reduction, but it is felt that the figures fail to prove the theory advocated.—H. C. Cowles.

1837. WAGER, HAROLD. *Presidential address. The significance of sex and nuclear fusions in the fungi.* *Trans. British Mycol. Soc.* 6: 305-317. 1920.—The introduction to this address includes brief references to THOMAS GIBBS, SIR CHARLES THOMAS DYKE ACLAND, DR. ARTHUR ECKLEY LECHMERE, CHARLES OGILVIE FARQUHARSON, and ANTHONY WALLIS, mycologists who died during the year. A historical résumé of the development of knowledge concerning sex and nuclear fusions in fungi is given. Normal sexual fusion includes at least 2 phenomena, the blending of 2 distinct lines of descent, and rejuvenescence of the reproductive cell by means of which it receives a new stimulus to growth and division. In the higher fungi the blending of 2 lines of descent seems to have become superfluous and a simple type of nuclear fusion concerned only with rejuvenescence is taking the place of the more complex process of binary sexual fusion.—W. B. McDougall.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

G. D. FULLER, *Assistant Editor*

(See in this issue Entries 1604, 1851, 1858, 1970, 2014, 2027, 2028, 2029, 2036, 2037, 2038, 2047, 2078, 2079, 2080, 2227, 2230, 2231, 2232)

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*J. V. HOFMANN, *Assistant Editor*

(See in this issue Entries 1819, 1820, 1823, 2009, 2010, 2011, 2105, 2107, 2109, 2121, 2123, 2124, 2187, 2227, 2234)

1838. ANONYMOUS. Departmental exploitation in the western Himalayas. *Indian Forester* 47: 1-11. 1921.

1839. ANONYMOUS. Forest Service. *Sci. Monthly* 12: 287. 1921.—This is a summary of Chief [U. S. A.] Forester W. B. GREELY's annual report.—*L. Pace*.

1840. ANONYMOUS. [Rev. of: HOWARD, A. L. *A manual of the timbers of the world, their characteristics and uses.* xvi + 446 p., 128 illus. Macmillan & Co.: London, 1920.] *Sci. Prog.* [London] 15: 499-500. 1921.

1841. BEESON, C. F. C. Food plants of Indian forest insects, Part V. *Indian Forester* 47: 21-25. 1921.—A continuation of previous work, the present compilation listing 25 insects which feed upon a variety of forest trees and shrubs.—*E. N. Munns*.

1842. BEESON, C. F. C. *Hoplocerambyx* and the dying off of sal. *Indian Forester* 47: 68-77. 1 fig. 1921.—A marked parallelism exists between the number of dead trees per year and the annual amount of rainfall; in abnormally wet years the number of sal dying is greatly increased, in abnormally dry years the number is very markedly decreased. The emergence period of the sal borer (*H. spinicornis*) is directly influenced by the initial date and extent of the rains through their effect on the moisture content of the heartwood of the sal and the relative humidity of the pupal chamber. In a wet year 75 per cent of the beetles emerge in the 1st month of the rains; in a dry year the period is prolonged nearly 2 months. The wet year increases the damage to sal by bad aeration through a rise in the water table, especially on heavier soils. This weakening renders the tree much more susceptible to the borer attacks, the borer acting as a secondary factor.—Control measures during an epidemic call for the removal from the forest before the end of April of all attacked parts of trees down to 18 inches girth in normal years and the removal of all parts of trees down to 12 inches girth in years of early and abundant precipitation. Removal of dead and dying trees on which the foliage is turning brown and trees with green foliage but with an abundant ejection of wood dust is indicated.—*E. N. Munns*.

1843. BENNETT, H. C. Experiments in sowing seeds of *Cassia auriculata* at Golla, Anantapur. *Indian Forester* 47: 25-29. 1921.—Six methods of seed sowing have been tried, each on 5 acres. Sowing in furrows gives the cheapest successful result, but plowing, hoeing, and harrowing give the best results.—*E. N. Munns*.

1844. BROWN, N. C. Vallombrosa forest in Italy. *Amer. Forestry* 26: 647-654. 15 fig. 1920.—The forest consists of 3500 acres, 875 acres chestnut and 125 acres containing 3 varieties of Italian pines. The remainder is made up of European beech (*Fagus sylvatica*) and silver fir (*Abies pectinata*). The forest has been under continuous management by Italian forestry officials since 1869, and for centuries before that date by the monks.—*Chas. H. Otis*.

1845. BUTLER, O. M. Forest conservation by better utilization. *Amer. Forestry* 26: 682-683, 691. 1920.

1846. CHAYTOR, A. H. Planting Douglas fir and Sitka spruce in cleared coppice. *Quart. Jour. Forest.* 14: 161-164. 1920.—Plantations of Douglas fir, Sitka spruce, and Japanese larch set out in old coppice woods at Iridge Place, Hurst Green, Sussex, England, from the years 1910 to 1913, were tended very carefully previous to the war, the rubbish and coppice

being cleared each year from around each tree; owing to the absence of woodsmen and keepers the trees were allowed to shift for themselves during the war. Under the latter condition the Douglas fir and Sitka spruce have thrived fully as well or better than under the former treatment. The larches have not been so successful under neglect, because where completely overtopped they have often died back at the tip or succumbed outright. Except where the tops have been whipped by the underwood, Douglas fir and Sitka spruce are in perfect health although completely covered by coppice. All that is required is the removal of overhead branches that will interfere with the growth of the leading shoot; to do more seems a waste of labor and money. During the war rabbits killed many larches but did little damage to Douglas fir or Sitka spruce. The fir and spruce, even up to 5 and 6 ft. high, transplant well if moved in autumn with a ball of earth. A spacing of 9 by 9 feet is advocated for Douglas fir in strong coppice.—*C. R. Tillotson.*

1847. CRAFT, Q. R. Timber conservation in Wyoming. *Amer. Forestry* 26: 740-741. 2 fig. 1920.

1848. GESCHWIND. Aus der Praxis der Saatschuldüngung im bosnisch-herzegovinischen Karstgebiete. [The practice of nursery fertilizing in the Karst region, Bosnia-Herzegovina.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 201-203. 1920.—Forest tree nurseries in the Karst (devoted to *Pinus austriaca*) are usually far from railroads. The soil is scanty and poor, and the nursery is soon in need of fertilizer not only to add the necessary chemical elements but to improve the physical condition of the soil as well. Owing to the difficulty of bringing in bulky fertilizers local sod has been used for some time with success by the writer. This is cut 14 × 50 cm. to fit between the seed rows (18 cm.) and placed grassy side down. It prevents compacting of the soil and discourages the growth of weeds; and as it rots (2 years) it enriches the soil. Small pieces of sod are gathered in heaps and covered with sod making in 2 years a rich compost that is spread between the rows after weeding.—The stock is grown for 2 years; after removal the remainder of the sod is turned in, the area reseeded and the space between the rows again sodded.—Soil collecting in holes in the limestone cliffs, a mixture of dust, lime fragments, mosses, algae, and bird and animal droppings, has also proved successful in maintaining the fertility of these nurseries.—*F. S. Baker.*

1849. GESCHWIND. Die Hasenschäden in den Schwarzkiefernkulturen des Karstes. [Rabbit damage in Austrian pine plantations of the Karst.] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 159-160. 1920.—Rabbit damage is severe in plantations of Austrian pine (*Pinus austriaca*) in the Karst region of Bosnia-Herzegovina for a period of about 5 years after planting. Two-year old seedlings are planted in deep holes and a depression is left around the stem to catch water. This, with a circling wall of stones, enables rabbits to reach the tops for some years. The greatest damage occurs the 1st winter after planting and in regions where the tree is being newly introduced. The rabbits do not appear to eat the pines as food, as the injury is found when other food is abundant; the uneaten top is often found near the plant.—Recovery is more general than in other regions as the rainfall and temperature produce a long favorable growing season. Trees usually recover in 3-4 years, unless the terminal is eaten off before side buds are formed (at 3-4 years of age). Adventitious buds rarely develop under these circumstances. Such trees are replaced immediately while others are left to recover, as they usually do if well rooted. Hunting out the rabbits in fenced and cultivated places is the best way of combating the evil.—*F. S. Baker.*

1850. GESCHWIND. Der planter- oder felmelwaldartige Niederwald. [The coppice selection forest.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 237-238. 1920.—The selection form of coppice forest seems never to have been definitely described although it is very common throughout the Balkan peninsula and is found in parts of Switzerland. Any coppice forest will assume a somewhat uneven-aged form since sprouting is not limited to any one year, although the oldest age class will predominate; especially in southern (warm) climates, where sprouting tends to continue more or less through the entire rotation, the appearance of the stand is not even-aged but of a selection form. Under the undeveloped forestry systems of

the Balkans such stands are managed under a rough selection system. The sprouts suffer much less from grazing damage, wind and snow breakage, and dryness than when clean cut; but due to light deficiency there is poorer development, and suppression may ultimately lead to bad openings in the stands. Felling is very much more difficult than when a clean-cutting method is used as the stands are dense and trees lodge badly. The author does not advocate the method, merely describes it, but presumes that it is much better adapted to southern countries than to those farther north, since sprouting under deficient light is much better in the south.—*F. S. Baker.*

1851. GREENFIELD, W. P. The sand-dunes of the Lincolnshire coast. *Quart. Jour. Forest.* 14: 176–184. 1920.—A general discussion of the sand dunes of the region and a plan for their reclamation. Afforestation cannot be considered as an actual means of sea-defense but should be a secondary operation following the fixing of the sand by means of the marram grass. Corsican pine at Holkham in Norfolk has proved the best species for planting on open parts exposed to sea breezes. In growth and hardihood, it far surpassed the Scotch and maritime pines.—*C. R. Tillotson.*

1852. GUTHRIE, J. D. The national forest resources of Alaska are for use. *Amer. Forestry* 27: 12–14. 5 fig. 1921.

1853. HARTEL, O. Ist die Wildbachverbauung notwendig? [Is control of torrents necessary?] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 171–172. 1920.—This question is treated under two heads: (1) How far is the great expense of torrent control economically justified, and (2) can poverty-stricken Austria afford the luxury of this control? The author shows that reforestation, protection, and careful regulation of the use of the watersheds, where the streams are small, helps greatly in ameliorating conditions in the main channels. Expensive engineering works have in the past been constructed in some places where only full protection of the upper slopes was needed. The work of the forester is inexpensive and can be carried on generally; expensive engineering works can be constructed if needed, following protection of the headwaters. Secondly, the author shows that Austria must control torrents both in view of hydro-electric developments and agriculture in the valleys.—*F. S. Baker.*

1854. HEADLEY, R. Fire protection to save our forests. *Amer. forestry* 26: 710–714. 4 fig. 1920.

1855. HENKEL, J. S. Forestry in Rhodesia. Improvement fellings on the farm. *Rhodesia Agric. Jour.* 18: 76–79. 1921.

1856. HENKEL, J. S. Forestry in Rhodesia. The management of woods. *Rhodesia Agric. Jour.* 17: 406–411. 1920.

1857. HENRY, AUGUSTINE. The artificial production of vigorous trees by hybridisation. *Quart. Jour. Forest.* 14: 253–257. 1920.—First generation hybrids in trees as in other plants are remarkable for their size, rapid growth, early and free flowering, ease with which they can be multiplied, and, in all probability, their comparative immunity to disease. The slow growth of the ordinary species of oak, ash, and walnut, except on the best agricultural soils, renders hopeless all possibility of an adequate financial return. Without vigorous 1st generation hybrids, the most valuable classes of timber can be grown only in limited quantity. There is the possibility of obtaining vigorous hybrids of the valuable species capable of thriving on soils ordinarily inhospitable. The relation of vigor in hybrids to the degree of relationship between the parents is unknown but of practical interest in the selection of parents for crossing experiments. Very little has been done in hybridization of forest trees. KLOTZSCH carried on experiments in 1845, at Berlin, with pine, oak, alder, and elm, and after 8 years the hybrids averaged $\frac{1}{3}$ larger than the parents. BURBANK's work with walnut in California has resulted in progeny of greater vigor. The author has produced a very vigorous hybrid, *Populus generosa*. Experiments carried out at Kew during the war with *Fraxinus excelsior*,

F. americana, *F. pennsylvanica*, and *F. oregona* resulted in progeny in nowise different from the carpellate parent. The author believes the artificial production of hybrid trees should be taken up seriously through the establishment of a research station, either in France or in the U. S. A.—*C. R. Tillotson*.

1858. HOOD, CONSTANCE C., AND MURIEL I. BACON. *Forestry in Morocco*. Quart. Jour. Forest. 14: 165-169. 1920.—Contrary to a commonly accepted idea, Morocco is not a desert country. The whole forest area may be divided into 3 zones. The 1st comprises the Forest of Marmora of 325,000 acres; it is open and without underwood. The species are cork-oak, Arar (*Thuya quadrivalvia*), and wild pear. The cork-oak makes this forest of especial interest and importance, it being the largest known forest of this species; the trees appear to flourish better here than in any other region, and the bark can be removed every 8 years (as compared with 13 years in the south of France), being then over an inch in thickness.—The 2nd zone covers a very large area, at present practically unsurveyed, extending over the Anti-Atlas regions. The species are cork-oak, maritime pine, cedar, juniper, yew, and maple. Large tracts of *Ilex* yield an excellent timber especially suitable for railroad ties. For the most part, the cedar grows pure and produces magnificent timber. Cedars 300-400 years old are 35-40 m. high and 5-6 m. in girth. These forests represent an enormous reserve awaiting future exploitation.—The 3rd zone is found in the south, in the Mogador-Agadir district, and comprises 1,250,000 acres. The soil is generally poor, varying from almost pure sand in the coast regions to calcareous in the extreme easterly portions. The prevailing species is the Argan (*Argania sideroxyylon*), of peculiar botanical interest because of its very limited distribution. The wood is very hard, heavy (sinks in water), and makes excellent charcoal. The first yields Argan oil, an important article of food in southern Morocco. In this region also juniper and Arar occur. The latter species provided the material for the celebrated Roman tables of "mottled wood;" it is also tapped for resin.—There has been considerable activity in planting trees for ornamental purposes. The trees used chiefly for this purpose are eucalyptus, mulberry, sycamore, Aleppo pine, Bella Ombra, and poplar.—*C. R. Tillotson*.

1859. HRP. *Zur Reform der Staatsforstverwaltung in Oesterreich*. [Reform of the state forest administration in Austria.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 87-88. 1920.—For a long time there has been a movement on foot among Austrian foresters to place technical foresters in the highest administrative offices in place of the jurists, who now occupy such positions. There are a number of indications (spring 1920) that the foresters have at last won their point.—*F. S. Baker*.

1860. KAY, JAMES. *Notes on jack pines and Sitka spruce*. Trans. Roy. Scottish Arboric. Soc. 34: 149-155. 1920.—Botanical and silvical descriptions of *Pinus divaricata* (*P. banksiana*), *P. contorta*, *P. contorta* var. *murrayana*, and *Picea sitchensis*.—*C. R. Tillotson*.

1861. L., F., UND K. V. *Zum Entwurfe eines neuen Forst-Servituten Gesetzes*. [Plans for a new forest servitude law.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 135-137. 1920.—Two separate articles under one title.—F. L. points out the harm of the present system of servitudes dating from 1853. As originally given out they permitted the use of only a fraction of the total wood product, and much wood was left over in the forest to go to waste. Now, however, they seriously embarrass the proper exploitation of the forests, since all holders of rights take the maximum allowance whether they use it personally or not, selling any surplus. Furthermore, the servitude gives a right to 70 per cent firewood and 30 per cent sawtimber, whereas the forest is actually producing about 70 per cent sawtimber and 30 per cent firewood. The deficiency necessitates the giving of sawtimber for use as firewood. The opinion that the servitudes ought to be changed is general; the holders of rights desire further extension, while foresters and others favor limitation.—K. V. desires a change in the servitudes in the interests of uniformity as they are quite variable in different parts of Austria. He regards them as a part of the rights of the people under a republican form of government, and would have them extended.—*F. S. Baker*.

1862. LAMB, G. N. **American grown cork.** Amer. Forestry 27: 15-16. 5 fig. 1921.
1863. LAPEYRERE, M. E. **The Landes of Gascony.** Trans. Roy. Scottish Arboric. Soc. 34: 155-167. 1920.—A historical review of the development of the Landes as a timber and turpentine producing region.—C. R. Tillotson.
1864. LR. **Aus ein Zypressenhain in Amerika.** [A cypress grove in America.] Wiener Allg. Forst- u. Jagd-Zeitg. 38: 270. 2 illus. 1920.—A note on Monterey cypress (*Cupressus macrocarpa*), with a description of the peculiar gnarled growth.—F. S. Baker.
1865. M'PHERSON, ALEX. **Commercial forestry in the Highlands.** Trans. Roy. Scottish Arboric. Soc. 34: 178-181. 1920.—Present tax laws make it impracticable to grow mature timber in the Scottish Highlands although timber of a superior quality can be produced there. The growing of pitwood should be the staple form of forestry. Plantations 19 and 27 years old disposed of for this purpose have yielded returns above interest of 16s. 9d., and £3 4s. 5d. per acre respectively. Pitwood on a 19-year rotation is a more profitable investment for land owners than sheep farming.—C. R. Tillotson.
1866. MOTTI, KARL. **Die forstlichen Verhältnisse im oberen Friaul.** [Forestry situation in upper Friuli.] Wiener Allg. Forst- u. Jagd-Zeitg. 38: 250-251, 255-257. 1920.—A description of the Aupatal or Val d'Aupa in upper Friuli, from a general and forest standpoint. This valley is in the Dolomite Alps in a region noted for torrents. It has good natural forests, mostly of spruce, but they have been much mismanaged. The article includes a description of the principal timber bodies and general forest conditions. No statistical information is included.—F. S. Baker.
1867. PACK, A. N. **Pulpwood from British Columbia.** Amer. Forestry 26: 715-719. 8 fig. 1920.
1868. PESCHAUT, ROMAN. **Elektrizität und Forstwirtschaft.** [Electricity and forestry.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 129-130. 1920.—Large power developments are planned on the Danube and other Austrian streams; there is considerable irregularity of flow, however, and dams will be necessary. The present over-cutting on higher watersheds and the unrestricted use of litter is tending to make the run-off still more irregular. The maintenance of forest cover is necessary for the most complete utilization of water for power, as is demanded by the proposed hydro-electric developments in Austria.—F. S. Baker.
1869. PETRASCHKE. **Die weitere Entwicklung der Kiefern-Hartznutzungstechnik.** [Further development of the turpentine technique in the pine.] Wiener Allg. Forst- u. Jagd-Zeitg. 38: 279-281, 285-287, 291-292. 1920.—This is a review and compilation of articles by many writers. It covers the anatomical and physiological factors governing resin production and flow, and the different methods that have been devised for tapping the trees and securing the resin, particularly the experimental methods using different forms of chipping and different frequencies.—F. S. Baker.
1870. PRINTZ, E. **Schwedens Holzhandel und Holzindustrie.** [The Swedish lumber industry.] Wiener Allg. Forst- u. Jagd-Zeitg. 38: 219-221. 1920.—This is a statistical article based on 2 books: "La Suede, son peuple et son industrie" by G. SUNDBARG, Stockholm, 1900, and "Eine forstliche Studienreise nach Schweden" by GABRIEL JANKA, Vienna, 1914.—F. S. Baker.
1871. RAGL, F. X. **Streunutzung in bayrischen Staatswald.** [Use of litter in Bavarian state forests.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 89. 1920.—During the war, regulation of the use of litter was relaxed and the annual consumption rose from about 735,000 cubic m. to millions. Many forests are now completely cleared and the demand far exceeds the supply. Reproduction is falling off and production is decreasing. Growth is less a function of stocking than of ground conditions, as shown by 2 similar adjacent areas. In the first the litter is

used and in the second it is left. Volume growth on the 2 areas is as 1 is to 2.5, the quality coefficient as 1 is to 1.5. Litter is deficient in potash and phosphorus and makes a poor fertilizer for agriculture; its highest value is realized in the forest.—*F. S. Baker.*

1872. RECORD, S. J. Scented woods. *Amer. Forestry* 26: 665-672. 20 fig. 1920.—A popular description of various odoriferous woods.—*Chas. H. Otis.*

1873. REISNER, J. H. Progress of forestry in China. *Amer. Forestry* 26: 655-658. 5 fig. 1920.

1874. RETTMAYER. Zum Windmantel 5 des Forstgesetzes. [Windbelts, section 5 of the forest laws.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 249-250. 1920.—A discussion of the meaning of the law and its practical application under different conditions.—*F. S. Baker.*

1875. ROWE, M. H. Mixed woods. *Quart. Jour. Forest.* 14: 171-176. 1920.—A silvicultural discussion of the advantages and disadvantages of mixed woods with suggestions as to desirable and undesirable species in mixture. The point is made that the safest and at the same time most easily managed system of mixing is by groups which are planted pure. Groups of shade-bearing species should be at least $\frac{1}{2}$ acre in size, more if possible; groups of light demanders should never exceed $\frac{1}{2}$ acre in extent, preferably $\frac{1}{4}$ acre. There is a good reason for small groups of light-demanding trees. After the thicket stage is past, the characteristic opening out inevitably ensues, thus permitting soil deterioration.—*C. R. Tillotson.*

1876. SIECKE, E. O., AND L. WYMAN. Forestry questions and answers. *Texas Agric. Exp. Sta. Forest. Bull.* 12. 15p. 1920.—This bulletin consists of general questions and answers as to present areas and conditions of Texas forests and other forestry problems of an elementary nature. One map shows the forested areas and type of forest in each; another divides the state into 5 tree-planting districts and lists trees suitable for each.—*L. Pace.*

1877. SIM, T. R. Pine tree culture in South Africa. A summary of the results of practical experiences. *South African Jour. Indust.* 4: 65-75. 1921.

1878. SIM, T. R. Timber trees for commercial culture. Species that have been tried in South Africa. *South African Jour. Indust.* 3: 1030-1039. 1920.

1879. SIM, T. R. Timber trees for South Africa. Eucalypts and others considered in detail. *South African Jour. Indust.* 3: 1155-1172. 1920.

1880. Sisson, G. W., JR. The pulp and paper industry. *Amer. Forestry* 26: 687-688. 1920.—[Extracts from an address at the New England Forestry Conference, Aug., 1920.]

1881. SLAVIK, VICTOR. Die Nonne. [The nun moth (*Liparis monacha*).] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 96-99, 110-111. 1920.—A full discussion of methods in vogue for discovering and destroying the nun moth, including the collection of caterpillars on standing and felled trees, destruction of eggs and general management of affected stands. Thinnings between April and August should not be carried on in affected forests. Fifteen points are enumerated in conclusion bearing on control of the nun, ranging from direct destruction to indirect educational means.—*F. S. Baker.*

1882. SMYTHIES, E. A. Afforestation of ravine lands in the Etawah District, United Provinces. *Indian Forest Rec.* 7th: 1-32. Pl. 1-34. 1920.—Deforestation and over-grazing are responsible for severe ravine erosion in all stream beds in the Gangetic plain where the population is dense. To check the erosion, it is proposed to reduce the velocity of the water by means of small dams and to improve the soil cover at the head of ravines. In the filled-in basins behind the dams trees are planted which make an excellent growth. On steep slopes, small contour terraces are made to prevent soil wash, to collect and store water, and to furnish places for seed and tree planting. The work is to be carried on as a measure of famine relief; and as labor at that time is cheap and plentiful, the work can be done at small cost, while the government receives a benefit from the famine relief.—*E. N. Munns.*

1883. STEWART, HUGH SHAW. Observations on the planting of the quicker growing conifers. *Trans. Roy. Scottish Arboric. Soc.* 34: 141-145. 1920.—Spacing even as close as 3 feet in the case of Douglas fir and Japanese larch does not prevent, and only partially restrains, branch growth. If clean boles are required, hand pruning close to the stem must be resorted to. Such spacing, moreover, results in the production of many suppressed boles of little value which interfere with the root development of the more vigorous, dominant neighbors. Spacings of $5\frac{1}{2}$, 6, and 7 feet are advocated respectively for Sitka spruce, Japanese larch, and Douglas fir.—*C. R. Tillotson*.

1884. STUART, J. S. NIBLOCK. The effect of storms on certain forests in the Tsolo district, Cape Province. *Jour. Dept. Agric. Union of South Africa* 1: 750-754. 3 pl. 1920.

1885. TROMP, F. J. Essential oils, with special reference to those obtained from the Eucalypts. *South African Jour. Indust.* 4: 85-89. 1921.

1886. VENDELMANN, HENRY. Forestry by precultures. *Quart. Jour. Forest.* 14: 185-190. 1920.—Forestry by precultures has been attended with such striking success that it is being widely adopted. It consists in improving the soil to such an extent that it becomes suited to the varieties of trees which have been selected for planting. Improvement of the soil is brought about by deep surface plowing, subsoil plowing where there is hardpan, the adding of commercial fertilizers, and the growing of green manures. This is followed by an agricultural crop, against which the cost of soil improvement can be charged. Some trees can be grown by sowing the seed with the grain crop. In the case of others, 1 or 2-year seedlings are planted following the removal of the grain, the land being in such condition that planting can be carried on very rapidly. In December (shortest days of the year) an average of 8,000-9,000 1-year firs were planted in a day by 1 splitter and 2 boy planters. On a particular day, 1 splitter and 3 boy planters put in 18,000 plants.—*C. R. Tillotson*.

1887. WATT, A. S. The biological basis of forestry. *Trans. Roy. Scottish Arboric. Soc.* 34: 210-216. 1920.—The author emphasizes the need of an adequate understanding of the biological factors entering into the growth of trees in stands in order to place forestry upon a scientific as well as a sound economic basis and to avoid the evil results of the application of imperfect knowledge.—*C. R. Tillotson*.

1888. WEISS, F. E. Fibre yielding plants and their economic importance. *Ann. Rept. and Trans. Manchester Microsc. Soc.* 1919: 25-31. 1920.—Presidential address delivered February 13, 1919. A brief enumeration and description of plant tissues and parts used in various portions of the world in the making of paper, cordage, and textiles.—*C. E. Allen*.

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 1589, 1590, 1601, 1608, 1615, 1774, 1812, 1837, 1857, 1955, 1962, 1967, 1972, 1974, 1975, 1990, 2012, 2091, 2104, 2194, 2263)

1889. ANONYMOUS. [Rev. of: ADAMI, J. G. *Medical contributions to the study of evolution*. xviii + 372 p., 7 pl., 18 fig. Duckworth & Co.: London, 1918.] *Sci. Prog.* [London] 13: 679-681. 1919.

1890. ANONYMOUS. *Biology of endogamy and exogamy*. [Rev. of: EAST, E. M., AND D. F. JONES. *Inbreeding and outbreeding: their genetic and sociological significance*. 285 p. J. B. Lippincott Co.: Philadelphia and London, 1919.] *Nature* 106: 335-336. 1920.—See Bot. Absts. 4, Entry 571.

1891. ANONYMOUS. South African's views of citrus methods used in California. [Rev. of and extracts from: FITZPATRICK, PERCY. *Citrus growing in California*. 32 p. National Bank of South Africa, Pretoria, 1920 (see Bot. Absts. 8, Entry 1910).] *California Citrograph* 6: 46, 62-64, 78, 99. 2 fig. Dec., 1920, and Jan., 1921.

1892. ANONYMOUS. [Rev. of: GAGER, C. S. *Heredity and evolution in plants*. xv + 265 p., 113 illus. P. Blakiston's Son & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672; 7, Entry 1610).] *Sci. Prog.* [London] 15: 498. 1921.—See also Bot. Absts. 8, Entry 1079.

1893. ALDER, B. *How to cull a flock of hens*. Utah Agric. Exp. Sta. Circ. 42. 3-8, 5 fig. 1920.—Author gives directions for distinguishing between laying and non-laying hens on the basis of the bodily changes which accompany the transition from one condition to the other.—*William A. Lippincott*.

1894. ANTHONY, R. *Le pseudo-hermaphroditisme tubaire chez les Cétacés mâles*. [Pseudo-hermaphroditism in the male Cetaceans.] *Compt. Rend. Acad. Sci. Paris* 171: 1398-1399. 1920.—Well developed male utricles and Muellerian ducts are regularly or occasionally found in male Cetaceans. Author regards this condition as primitive.—*A. Franklin Shull*.

1895. BECKER, J. *Xenien zwischen Melonen und Gürken*. [Xenia in muskmelons and cucumbers.] *Zeitschr. Pflanzenzücht.* 7: 362-364. Nov., 1920.—A testing out of the belief that cross-pollination of melons and cucumbers leads to xenia as evidenced by undesirable flavors. One cucumber resulted from 10 guarded hybridizations with melon pollen; its seeds were undeveloped but its flavor was not unusual.—*J. P. Kelly*.

1896. BENJAMIN, E. W. *A study of selections for the size, shape, and color of hens' eggs*. Cornell Univ. Agric. Exp. Sta. Mem. 31. 189-312, 1 pl., 37 fig. 1920.—This report covers the work of 8 years in which the author kept under minute observation and careful control large flocks of single-comb white Leghorn hens from the high-producing, trap-nested stock of the Cornell strain. Many correlation tables are presented.—The results show that a great deal of variation exists in the size, shape, and color of eggs from a single hen. This variation does not depend upon difference between the parents, but it is to some extent inherited. Color tends to be more irregular than the other characters. Size, shape, and color are inherited directly and equally from both parents. Small size and length of egg are dominant while no dominance occurs for color. A definite correlation exists between the characters of the egg set and those of the eggs of the hen it produces. This correlation, however, is not as great as the correlation between the means of the eggs produced by parents and offspring. No correlation was found between size, shape, and color, or any two of these characters. The size of eggs increases rapidly during the early part of the pullet year, while pigment continues to become darker until the end of the 2nd laying year. The offspring from pullets' eggs are not more variable than those from hens' eggs.—A positive correlation was found between the size of the egg and the weight and vigor of the bird produced. Size, shape, and color have no effect on the ability of the egg to hatch.—*H. G. May*.

1897. BLARINGHEM, L. *Anomalies florales observées sur la descendance de l'hybride Linaria vulgaris × L. striata*. [Floral anomalies observed in the descendants of the hybrid *Linaria vulgaris* × *L. striata*.] *Compt. Rend. Acad. Sci. Paris* 169: 1103-1105. 1919.—The F_1 of the cross of *Linaria vulgaris* × *L. striata* was found to be partially sterile, and only 17 F_2 plants were obtained. There was some sterility in the F_2 and several cases of abnormal floral development were observed.—*Karl Sax*.

1898. BRIDGES, CALVIN B. *The mutant crossveinless in Drosophila melanogaster*. *Proc. Nation. Acad. Sci.* 6: 660-663. 1920.—Author describes "crossveinless," a sex-linked mutant character in *Drosophila melanogaster*, and points out its usefulness in genetical experiments and its apparent homology with "crossveinless" in *D. virilis*.—*C. W. Metz*.

1899. BRYAN, W. E., AND C. O. BOND. **Plant breeding.** Arizona Agric. Exp. Sta. Rept. 29: 314-321. 1918.—Breeding results obtained in an effort to produce wheat of high yield with high gluten content of superior quality. For irrigated valleys of Arizona earliness is of prime importance in establishing such a wheat. Where late spring irrigation is necessary for late varieties quantity and quality of gluten are reduced.—Brief reports of investigations with beans, alfalfas, and sorghums are also made.—*J. P. Shelton.*

1900. BURGESS, C. H. **Breeding for egg production.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 190-192. 1 fig. 1920.—Data are presented which indicate "that higher egg-producing power" may be introduced into a flock of barred Plymouth Rocks or single-comb white Leghorns through males from high-producing dams.—*William A. Lippincott.*

1901. BUSH-BROWN, H. K. **Heredity in horses.** Jour. Heredity 11: 215-227. Fig. 16-27. 1920.—Distinction is made between skeleton of the Arab horse, which has 5 lumbar vertebrae, and all other horses, which have six. This difference is given as one of the outstanding causes of the greater endurance of the former. The limited data available indicate the short back to be recessive to the long back. A jenney bred to a stallion produced a hinney which inherited the 5 lumbar vertebrae of the dam. Likewise, a short-back mare bred to a stallion with 24 vertebrae produced a short-back offspring. The 3 instances of this combination led the author to suggest the dominance of the dam over the anatomy of the foal. The strength of the Arab horse as a weight-carrier is attributed to the shorter distance between the supports. In the army tests of 1920 the endurance of the Arab horses and their derivatives was superior to that of others.—*M. J. Dorsey.*

1902. CHERRY, T. **The evolution of man and his mind.** Sci. Prog. [London] 15: 74-100. 1920.—A speculation in regard to the origin of man. "The recent advances in knowledge have introduced new difficulties both on the side of structure and of function, and have made untenable the current theory of the comparatively recent separation of the human and the ape stocks." These difficulties are discussed under 2 examples of structure—(a) the premaxilla, present in the apes and absent in man, and (b) the foot; and 2 examples of function—(a) instinct, practically lacking in man, and (b) the growth and metabolism of the body, based on RUBNER's work. Other difficulties are mentioned and the importance of DOLLO's law of the "irreversibility of the course of evolution" is emphasized.—The writer then undertakes to reconstruct a theory of human phylogeny. He starts with "a generalized primate of the *Anaptomorphus* type . . . about as large as a rat," inhabiting trees of the Lower Eocene and feeding on birds chiefly by night. Probably during the Eocene "the lemurs, New World monkeys, and Old World monkeys separated from one another" and in the Upper Eocene "the branch of the Old World monkeys which gave rise to the apes and man came to the ground." The common ancestor acquired a fair approximation to a bipedal gait and the diet consisted largely of lizards, grubs, and scorpions as evidenced by the digestive organs. The changes that now take place leading toward man require 2 conditions of environment, namely, abundance of easily obtained nitrogenous food, and safety. These conditions are most fully met on the seashore. "It is therefore in no way improbable that one family of the Late Eocene primates may have chanced on some part of the beach where shellfish are plentiful and there begun a course of evolution different from all their former associates in the trees." Ancestors of the apes from time to time, but at a very early period, left the seaside and returned to the trees; first, the early gibbons, next the orang, and finally the common ancestor of the gorilla and chimpanzee, leaving the human stock to work out its evolution under seaside conditions. The writer then develops his theory of the evolution of man in adaptation to a seashore environment, including small teeth, slow movements, lack of organs for attack or defence, naked skin, monthly cycle in woman, free shoulder-joint, and development of the brain.—*Howard J. Banker.*

1903. COLLINS, G. N. **Dominance and the vigor of first generation hybrids.** Amer. Nat. 55: 116-133. 1 fig. Mar.-Apr., 1921.—Author believes that the explanation of heterosis should place emphasis on suppression of deleterious recessive characters rather than on accumulation of

dominant growth factors. Evolutionary progress depends on advantageous variations, but these are rare and their effect negligible in explaining heterosis. Practically all known maize variations are detrimental, and the vast majority of them recessive. (Deleterious dominant mutations are quickly eliminated.) Furthermore, present knowledge indicates that the rôle of linkage must be of minor importance in maize; and the question is raised whether the assumption of linkage is necessary to explain heterosis.—Difficulty of securing uniform strains with the vigor of F_1 has been assumed rather than demonstrated, since selection following hybridization has never been continued long enough to approximate such homozygosity. Author considers certain data of EMERSON and EAST (1913) together with some of his own on height. "In every case where a progeny was grown from a plant near the upper limit of the range of the F_2 its mean exceeded that of the F_1 ." Some of the data on length and diameter of ear and length of internode also suggest isolation of strains with vigor of F_1 . Tables are presented showing extreme practical difficulty (due to large numbers which must be grown) of obtaining homozygous F_2 individuals with vigor of F_1 (even without assuming linkage). To obtain 1 individual 70 per cent homozygous, assuming 15 effective character pairs, would require growing 6000 F_2 individuals. On question of skew distribution of F_2 vigor due to dominance (without linkage), author presents significant table with accompanying graph. With 20 character pairs involved, populations of 500 individuals would conform with normal frequency curve; skewness would be detectable only in enormous F_2 populations. Assumption that relative effect of a given growth factor depends on size of organism also assists in veiling skewness. Author concludes that heterosis is due to suppression of deleterious recessive characters, and can be explained without assuming linkage.—*Merle C. Coulter*.

1904. CUTLER, D. WARD. The cytological problems arising from the study of artificial parthenogenesis. *Sci. Prog.* [London] 15: 435-444. 1 fig. 1921.—Review of some of the evidence for (1) individuality of chromosomes, and (2) relation of chromosomes to sex, preparatory to discussion of artificial parthenogenesis in later article.—*A. Franklin Shull*.

1905. DETJEN, L. R. Peloria in *Viola primulaefolia* Linn. *Torreyia* 20: 107-116. 10 fig. 1920.—A strain of violets bearing peloric and partially peloric flowers was propagated from a single plant found in nature. The completely peloric flowers are symmetrical, having 4 sepals, 4 petals, 4 stamens, and a pistil of 4 carpels.—*E. G. Anderson*.

1906. DETLEFSEN, J. A., AND W. J. CARMICHAEL. Inheritance of syndactylism, black, and dilution in swine. *Jour. Agric. Res.* 20: 595-604. 1 pl. 1921.—A registered mule-foot boar (syndactyl, black) crossed with registered Duroc-Jersey sows (cloven-foot, red) produced only black, mule-foot pigs. The results of a back-cross with a Duroc-Jersey boar indicated independent segregation of a unit factor for mule-foot dominant over cloven-foot and a unit factor for black dominant over red. The red cloven-foot segregates bred true in F_3 and F_4 . The "red" segregates varied between intense red and cream. The so-called creams were absolutely white at birth, merely developing traces of yellow medullary pigment later. The data were insufficient to determine the mode of inheritance of the grades of intensity but confirmed earlier work indicating that white in swine often represents extreme dilution of red due to factors which dilute red but which do not dilute black to a perceptible extent.—*Sewall Wright*.

1907. DETLEFSEN, J. A., AND E. ROBERTS. Studies on crossing over. I. The effect of selection on cross-over values. *Jour. Exp. Zool.* 32: 333-354. 2 fig. Feb. 20, 1921.—The authors selected for high and low crossover values in *Drosophila melanogaster*. They used the characters white and miniature, the genes of which lie in the X chromosome. In order to save work and time single pair matings were made only in alternate generations. The other generations were mass cultures. In the A series the first 5 generations of selection made no change. There was considerable fluctuation. After the 5th generation progress was rapid. The normal percentage of crossing over between white and miniature is 33. In F_5 the authors had reduced it to 16.49. From F_{10} to F_{13} the percentage was reduced to less than 1. The last generations were bred under abnormal conditions and the numbers were few. Series A₁

was started from the 7th generation of series A and continued to F_{15} . The average percentage for these generations was 0.64. Here again the numbers were not large. Series B was also selected for low crossover values. For the first few generations there was no effect. In F_7 a pair gave 14.34 per cent. From F_8 to F_{14} the percentage fluctuated between 10 and 23. From F_{15} to F_{23} it varied around 10 and from F_{23} to F_{29} around 6. After F_{23} the line bred true for low crossover values in mass cultures for 23 generations.—Series C was selected for high crossover values. It was carried for 8 generations only and no progress was made. In F_7 9 pairs gave low crossover values, less than 6 per cent. The authors interpret this to mean that double crossing over had been induced, resulting in a decreased percentage. After making several suggestions the authors concluded that "crossing over in the various regions of the sex chromosome is probably controlled by multiple incompletely dominant factors."—*F. Payne.*

1908. EAST, E. M., AND D. F. JONES. Genetic studies on the protein content in maize. *Genetics* 5: 543-610. 8 fig. Nov., 1920.—Following a discussion of breeding plants for altered chemical composition, the work of the Illinois Agricultural Experiment Station on high and low protein content in maize is reviewed in detail. The conclusion is reached that the individual seed rather than the entire ear should be used as the basis of selection. In a comparison between guarded self-pollinated ears and open or wind-pollinated ears, it was found in the majority of cases that the seeds of the self-pollinated ear had the highest percentage of protein. Pursuing the problem from this point, a test was made to determine the immediate effect of pollination on the composition of the seed. It was found that in each of 32 comparisons the crossed seeds weighed more than the selfed seeds, supporting previous results. With respect to the protein content the effect of cross-pollination is slight, 7 of the 32 cases showing an increased percentage of protein but on the average a slight decrease. This decrease is not accounted for entirely by the increase in weight of seed since the total amount of protein also is increased.—When a mixture of pollen from high- and low-protein plants was applied to plants of a high-protein strain a significantly higher percentage of protein was found where both parents were high in protein. The protein content of different self-pollinated ears borne on the same plant was tested and little difference found.—In a chemical analysis of 2nd generation seeds borne on 1st generation plants it was found that while the percentage of protein was reduced the total amount per acre was increased due to the increase in yield.—In conclusion the authors state that the protein content of the seeds is determined largely by heredity although variations as high as 40 per cent may be caused by environmental fluctuations. The number of differentiating hereditary factors involved cannot be determined nor their method of inheritance described, but they are believed to be in excess of 5 or 6 with the possibility of a smaller number of main factors and numerous subsidiary ones.—Twenty per cent of the protein of the seed is in the embryo and 80 per cent in the endosperm. The notable variations appear in the endosperm. Heterosis increases the size of the seeds with a consequent reduction in the per cent of protein. This is especially noticeable in seeds borne by hybrid plants. F_1 seeds when corrected for the influence of heterosis have a protein content intermediate between those of the parents, with perhaps a tendency to be closer to that of the high-protein parent.—The factors borne by the male gamete are practically without immediate influence on the protein content leading to the belief that the constitution of the mother plant is the major determining factor.—If a high-protein strain is found to be desirable it can be obtained more rapidly by the isolation and recombination of homozygous high-protein strains than by the method of mass selection followed in the classical experiment at Illinois.—*J. H. Kempton.*

1909. FIRBAS, HEINRICH. Über die Erzeugung von Weizen-Roggenbastardierungen. [The production of wheat-rye hybrids.] *Zeitschr. Pflanzenzücht.* 7: 249-282. Nov., 1920.—Author studied conditions affecting set of seed when wheat was crossed with rye. Flowers were pollinated just after blooming and also at later dates, better results being obtained with the earlier applications. Pollinations were made in heated and unheated rooms, under dry and moist conditions, and at different times of the day; it is concluded that such external condi-

tions had little or no influence on the setting of seed. Old pollen gave apparently as good results as fresh, other conditions being equal.—Whether glass tubes or paper were used in covering the flowers did not affect the results. The factor that played the greatest part in securing a good set of seed was the difference between wheat races and between individuals within these races. The influence of the individuals in obtaining many seeds is not the same for all races. With some races the individuality is of greatest importance. The influence of the individual is greater with wild races than with cultivated ones. Individuality in the case of the male plants is not marked.—Reciprocal crosses using rye as the female parent have not yet been obtained.—Certain wheat races, such as Bokara, give more seed when pollinated with rye.—*H. H. Love.*

1910. FITZPATRICK, PERCY. Citrus growing in California. 32 p. National Bank of South Africa, Pretoria, [1920].—A popular discussion is included of “bud variation” in citrus fruits, with especial consideration of SHAMEL’s work and of the resulting practice of propagating from “performance-record” trees. WEBBER’s study of variation in seedling stocks is also discussed.—*Howard B. Frost.*

1911. FRANCE, L. V. The problem of controlled fertilization of queen bees. Jour. Econ. Entomol. 14: 105–110. Feb., 1921.—Author emphasizes the importance to commercial beekeepers of controlled matings and cites a number of experiments recorded in the beekeeping literature to this end. No new trials are recorded.—*E. F. Phillips.*

1912. GALANT, S. Über die Entstehung von Variationen bei Anemone hepatica. [On the origin of variations in Anemone hepatica.] Biol. Centralbl. 39: 529–535. 1919.—Observations were made on 1729 flowers of *A. hepatica* [*Hepatica triloba*] gathered on the Belpberg. Modal number for colored perianth leaves (referred to as petals) was 6 and was shown in 1180 of the 1729 flowers; range was from 7 to 11, inclusive. Mode for sepal-like leaves was 3 exhibited by 1665 flowers, and range was from 2 to 5, inclusive. No calculated constants are given. Author dissents from BOHN’s hypothesis that variations in general indicate disease and suggests that increase in number of petals is due to metamorphosis of stamens or sepals. He comments also on color variation, noting especially that 2 white flowers occurred in a total of 1729, and quotes CHODAT to the effect that whiteness maintains itself in cultures.—*James P. Kelly.*

1913. GILLIES, C. D. Variation of sepals of Bruguiera Rheedii Blume. Proc. Roy. Soc. Queensland 30: 95–96. 1918.—The calyx of the mangrove is a conspicuous red structure commonly found in the tidal debris along the ocean shores at certain points. In 118 calyces collected the number of sepals varied from 9 to 13, the frequencies being as follows:

No. of sepals.....	9	10	11	12	13
Frequency.....	13	47	38	17	3

From these data the following constants were calculated: Mean, 10.57±.002; mode, 10.471; standard deviation 3±.001; coefficient of variability, 2.84±.001. The frequency polygon is unimodal; the theoretical mode is 10.471; actual mode, 10. Coefficient of variability, 2.84, is a low value.—*E. B. Babcock.*

1914. GOODALE, H. D., RUBY SANBRON, AND DONALD WHITE. Broodiness in domestic fowl. Data concerning its inheritance in the Rhode Island Red breed. Massachusetts Agric. Exp. Sta. Bull. 199. 93–116, 4 fig. 1920.—A broody bird in the Rhode Island Red breed is recognized by its tendency to remain on nest when not laying, the ruffling of feathers and clucking. Confinement for 3–6 days with food breaks up broodiness. Hens are grouped as broody and non-broody. Broody hens may have a broody period early in 1st laying year or later. Broody periods usually recur at short intervals after the 1st period. Non-broody hens sometimes show broodiness in succeeding years.—The data confirm the theory that broodiness is due to 2 dominants; but some evidence also exists that a dominant for non-broodiness is present in some cases. Selection quickly changed a very broody flock to one with few broody hens. Matings between non-broody stock sometimes give broody offspring.—*H. G. May.*

1915. GUILLEMINOT, H. Le deuxième postulat du calcul des probabilités et la loi d'option dans l'évolution de la matière vivante. [The second postulate of the calculus of probabilities and the law of option in the evolution of living matter.] *Compt. Rend. Acad. Sci. Paris* 169: 993-995. 1919.—Organic phenomena differ from inorganic in that the probability of a given reaction of an organism is affected by its prior reactions.—*John Rice Miner*.

1916. HAECKER, V. Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung. [On further correlations in the field of Mendelian investigation.] *Pflügers Arch. Ges. Physiol.* 181: 149-169. 1920.—A theoretical discussion of relations between mode of development of characters and mode of inheritance. Author holds that characters which are caused in a simple way and undergo autonomic development from the first appearance of the "anlage" are apt to show clear-cut segregation, while characters which are caused by a complex of causes and with correlative development tend to show more or less departure from the Mendelian scheme, as irregular dominance, unusual ratios caused by impure segregation, modifiability by selection, and, if pathological, correlation or alternation with other anomalies. A given character of the 1st class is likely to appear in many more or less closely related species, while characters of the 2nd class tend to be limited to one species. Those of the 1st class arise by mutation, those of the 2nd by gradual change; those of the 1st class are degenerative or of no biologic significance, while the 2nd class includes the adaptive and other species-forming changes.—*Sewall Wright*.

1917. HARLAND, S. C. Inheritance of certain characters in the cowpea (*Vigna sinensis*). II. *Jour. Genetics* 10: 193-205. 1920.—Experimental genetic data on 4 series of characters in cowpea—anthocyanin in stem and leaf stalk, seed-coat pattern color, pod color, and flower color. Results on F_1 , F_2 , and F_3 generations are given. Anthocyanin coloration in stem and leaf stalk is due to factor X , dominant to its absence. Seed-coat pattern colors—black, brown, buff, maroon, red, and white—result from various combinations of 4 factors, B (black), N (buff), M (maroon), and R (red), and their absences. New-Era pattern of seed coat is due to factor E , which expresses itself only in the presence of R . The albino type, Para, carries 2 seed-coat pattern factors, D and H (either H_1 or H_2), which produce no visible expression except in the presence of R . Purple-pod types differ from green-pod types by 1 main factor, P , although F_2 ratio suggests that more than 1 pair of factors may be involved. Purple pod is partially dominant in F_1 . Pigment factors B (black) and E (New Era) show repulsion on a basis probably higher than 1:15. Factor B also shows repulsion with factor P (purple pod), probably on a basis higher than 1:7. Tinged flower color is due to factor G , dominant to its absence but recessive to D , the factor for dark flower color.—*Orland E. White*.

1918. HARLAND, S. C. Inheritance in *Ricinus communis* L. Part 1. *Jour. Genetics* 10: 207-218. 1920.—Experimental results involved data on 3 sets of characters, as follows: Presence and absence of a waxy bloom on stems, petioles and capsules; presence and absence of spines on capsules; and stem colors of 4 kinds. Previous investigations are reviewed. F_1 , F_2 , and F_3 results are tabulated. Presence of bloom (B) is partially dominant to its absence (b). Spiny capsule (S) is partially dominant to its absence, smooth capsule (s). Two pairs of factors are concerned in crosses involving stem color, as green \times mahogany gave in F_1 , rose, which in F_2 gave approximately 9 rose: 3 mahogany: 3 green: 1 tinged. The results are interpreted as due to combinations of 2 pairs of factors—the presence and absence of M (mahogany) and the presence and absence of G (green). The F_2 ratio would be 9 MG : 3 Mg : 3 mG : 1 mg . Experiments so far show that S and M , S and B , M and G , and perhaps G and B are not linked. Factors M and B show repulsion in cross $Mb \times mB$.—*Orland E. White*.

1919. HARTLEY, C. P., AND H. S. GARRISON. Reproducing power of well-filled vs. poorly filled ears of maize. *Amer. Nat.* 55: 184-187. 1 fig. 1921.—Occasionally poorly fertilized ears of maize are found in which the failure to develop seed normally is due to accidental causes. An effort was made to determine whether the yielding power of such ears was as great as that of ears normally fertilized. Poorly fertilized ears were produced artificially by 2 methods,

(1) bagging silks an inch long after they had been exposed to pollen, and (2) exposing previously bagged silks for about half an hour and then rebagging. In neither case was the source of the pollen controlled. The ears of the 1st lot had seeds arranged compactly but confined to the butts, while those of the 2nd lot had seeds scattered throughout. Both lots were compared with normally fertilized ears of the same strains but no significant differences in yield were obtained.—*J. H. Kempton.*

1920. HONING, J. A. *Selectie-Proeven met Deli-Tabak IV.* [Selection experiments with Deli tobacco IV.] Mededeel. Deli-Proefsta. Medan [Sumatra] II. 10: 43-59. 1920.—In the 1918 large-scale tests, light (colored) line No. 1 produced longer, broader leaves lighter in color, with less of the fallow-colored and checkered or dapple grades, as compared with the control tobacco, the results thus agreeing with those obtained in 1917 and 1918. This line is especially valuable on the higher-lying estates which tend to produce relatively dark tobacco. Fallow-colored line 3 yielded a distinct fallow shade, running through all the color grades. The percentage of checkered leaf was smaller than in the control but the leaf was somewhat shorter and a little dryer in character. Two additional lines gave good results while another was not a success. A new selection grown on 16 estates did not equal some of the older strains.—*W. W. Garner.*

1921. HUMPHREY, S. H. *The menace of the half-man.* Jour. Heredity 11: 228-232. 1920.—A general discussion of the rate of reproduction in the "morons" or "borderliners," so-called poorer stocks, and best stock, in its bearing upon the national life and society. The influence of the reproduction rate of the poorer stocks is traced in the school, in charity, and in industry. Emphasis is placed upon the futility of attacking the problem through an improved environment when heredity is at its base.—*M. J. Dorsey.*

1922. JOHNSON, E. C. *Twenty-ninth annual report.* Washington [State] Agric. Exp. Sta. Bull. 155. 57 p. 1920.—Brief summary is made of inheritance, in wheat crosses, of resistance to smut. In crosses between winter and spring wheats the F_1 ripened late. In F_2 , spring, F_1 , and winter type appeared in a 1:2:1 ratio. Minor factors were also involved.—Early dropping of apple fruit was found to be correlated with failure to set sufficient seeds per fruit. As much as 68 per cent of dropped fruit contained no normal seed.—Plans for Mendelian studies with blackberry and raspberry hybrids are outlined. [See also Bot. Absts. 7, Entry 1554.].—*H. K. Hayes.*

1923. KEMPTON, J. H. *A brachytic variation in maize.* U. S. Dept. Agric. Bull. 925. 28 p., 19 pl., 8 fig. 1921.—A new dwarf type of maize, "brachytic," is described and its inheritance discussed. This type is the result of a shortening of the internodes without corresponding reduction in their number or in the number and size of other organs. It was discovered in a 2nd hybrid generation of a cross between Algerian pop-corn and Chinese waxy-endosperm corn, the inference being that it had been carried by the Chinese parent as a recessive, heritable character.—When self-pollinated, the brachytic type produced nothing but brachytic plants. When crossed with normal-type plants, the F_1 proved to be tall and in F_2 the brachytic character segregated in the simple monohybrid fashion. The F_2 brachytic segregates, from a Boone County White-brachytic cross, showed no increase in variability as regards height of plants compared with ordinary brachytic plants. The length of ear, however, of some of these dwarf segregates appeared to be increased, showing that the dwarf type can be maintained and the yield increased somewhat by such crossing. This is an important consideration if the brachytic type is ever to be used commercially (a possibility that the author suggests) since its present yield is relatively low. For dry land and irrigated regions, the brachytic type of structure might prove to be well adapted.—Two teratological forms of maize are also described and a preliminary note concerning their heritability is given. In one of these, designated "adherent," the leaves of the seedling, or even of mature plant, do not unroll normally. The growing culm is unable to break through these leaves and is forced into many contortions in attempting to elongate. This form appears to be recessive in inheritance.—Another abnormality described is one in which the ears end in staminate

spikes. The inheritance of this type is not completely solved as yet. From the appearance and development of ears ending in staminate spikes and of ears borne as basal branches of the terminal inflorescence (noted in a Hopi-brachytic cross), the author suggests "that the ear of maize may have developed from the basal branches of the terminal panicle rather than from the central spike of the terminal inflorescence of a lateral branch of the main culm."—Many good illustrations are given of the types of maize under discussion.—*E. W. Lindstrom.*

1924. KEMPTON, J. H. Linkage between brachytic culms and pericarp and cob color in maize. Jour. Washington [D.C.] Acad. Sci. 11: 13-20. 1920.—Author summarizes genetic linkages that have been reported for maize and describes a new case of linkage. Brachytic (*br*) maize, which is a dwarf type recessive to normal stature, is found to be linked with pericarp and cob color. Three crosses involving the normal-brachytic and colored-colorless pericarp and cob factors give fairly large F_2 distributions showing linkage relations that varied from 35 to 38 per cent crossing over.—Data are presented from these F_2 families that indicate independent inheritance between brachytic culm and liguleless leaf as well as between cob color and liguleless leaf.—*E. W. Lindstrom.*

1925. KOTTUR, G. L. "Kumpta" cotton and its improvement. Mem. Dept. Agric. India Bot. Ser. 10: 221-272. Pl. 1-7. 1920.—"Kumpta" is the trade name of a type of *Gossypium herbaceum* extensively grown in India. Author demonstrated that the type comprises several strains differing in number of vegetative branches, size and shape of leaves, length of bracts and petals, size and shape of bolls, weight of seed, and length of fiber. A strain developed by selection and decidedly superior to the average of the type in habit of growth, earliness, productivity, and abundance and length of fiber is described.—*T. H. Kearney.*

1926. LAUGHLIN, HARRY H. Calculating ancestral influence in man; a mathematical measure of the facts of bisexual heredity. Genetics 5: 435-458. 2 pl., 1 fig. Sept., 1920.—Twenty-five formulae governing ancestral inheritance in general are presented, based on: (1) Bisexual reproduction; (2) heterozygosis for sex factor in one sex; and (3) the number of pairs of chromosomes. Cognizance is taken of the necessity for increased accuracy by means of future inclusion of provisions for sex-linked traits, relative weighting of chromosome groups, maternal or paternal source of chromosome, dominance or recessiveness of gene, and relative frequency of mutation, crossing-over, non-disjunction, and others special chromosome phenomena; but these are not considered in the formulae developed, since they would operate only as special modifications of the general case. Figure 1 presents a clever mechanism for demonstrating the segregation and recombination of chromosomes from ancestors to descendants, with specifications for its construction. Plate 1 diagrams ancestral inheritance in the human male, based on 12 pairs of chromosomes, showing the "X-trails" and "Y trails" of descent for the X and Y chromosomes, and calculates the average, range and chance of contribution of chromosomes to the F_1 zygote in P_2 , P_3 , and P , while plate 2 presents the same data for the human female, with suitable changes for sex. Similar constants for P_4 and P_5 are included in notes accompanying the plates.—*Edward N. Wentworth.*

1927. LINEBACK, P. E. A case of unilateral polydactyly in a 22-mm. embryo. Anat. Rec. 20: 313-319. 1 fig. Feb. 20, 1921.—A 22 mm. human embryo was found to have an extra digit on the radial side of the right hand. This is apparently the youngest polydactyl individual thus far recorded. Unfortunately there is no information as to its parentage. Microscopic study reveals all the usual cartilaginous elements of the hand present and normal. In addition there is a single extra cartilage associated with the supernumerary digit. There are two muscles extending into the extra digit, but no obvious nerves and only capillary blood vessels. The specimen "offers proof that some cases of polydactyly owe their origin to earlier causes than external factors or deviation of ossification centers." The condition is believed to be wholly distinct from hyperphalangy of the thumb.—*C. H. Danforth.*

1928. LITTLE, C. C. Report of the Committee on Genetic Form and Nomenclature. Amer. Nat. 55: 175-178. 1921.—This is the first report of a committee appointed in 1919 by the

American Society of Naturalists, and is a constructive attempt to promote an established system in genetic usage, particularly of symbols for the representation of factors. The report makes the following suggestions: (1) That a type (the wild when possible) be named, and that genetic factors in general be measured by their departure from this. (2) That members of an allelomorph series dominant to the type be designated by the same symbol as the type in capitals and with appropriate superscripts, and that recessive members have the same symbol in lower case with superscripts. (3) That dominance be recognized by departure from type in the heterozygote. (4) That in addition to literal (mnemonic) superscripts, numerical superscripts may also be used to indicate the relative degree of departure from type of each member of the allelomorph series. (5) Independent allelomorphs or allelomorph series may be represented by different letters, or, where they produce similar effects, by the same letter followed by a designating numeral. (6) "Doubtful factors," whose presence is uncertain, may be represented by their respective symbols with superscript x or $?$. (7) The presence of modifiers of the effect of any factor may be represented by the symbol $[+]$; thus $[S+]$ may represent "+ modifiers of the effect produced by the S (spotting) series of allelomorphs," and when it is desired to express the degree of modification, numbers may be used for that purpose, as $[+4.2]$ or $[-2.5]$. (8) "Linkage is best represented by the fractional form used by workers on *Drosophila*."—The report is published in the hope that it will stimulate discussion and suggestions.—*L. J. Cole*.

1929. McCANDLISH, A. C. Environment and breeding as factors influencing milk production. Jour. Heredity 11: 204-214. Fig. 6-15. 1920.—An account of an experiment at the Iowa Agricultural Experiment Station to demonstrate the possibilities of improving a scrub herd. The animals used were inferior as a dairy type and were low producers. These cows were put in with the Station herd and given the same feed and care as the pure breeds. Careful milk and butter-fat records were kept as guides to feeding methods. The scrub cows were mated to pure-bred sires of Holstein, Guernsey and Jersey breeds and the heifer calves resulting were maintained under the same conditions as the other animals. Records are now available on 2 generations of grades descended from scrub cows and 1 animal of the next generation has just entered the herd. The influence of environment upon production is shown by the records. When the scrub cows that came to the station after reaching maturity are compared with those coming at 4 years of age and with those coming before the first freshening, it was found that the former produced 14 per cent more milk and 8 per cent more fat, and the latter 27 per cent more milk and 24 per cent more fat. Scrub bulls will give no improvement in the production of a herd. Pure bred sires on the other hand showed a marked improvement in production in both the 1st generation and 2nd generation grades. The 1st generation taken as a group showed increases of 39 and 37 per cent in milk and fat production respectively when compared with their dams, and the 2nd generation, so compared, increases of 116 and 106 per cent respectively in milk and fat production. Both breeding and environment are thus shown to be important factors in production.—*M. J. Dorsey*.

1930. McROSTIE, G. P. Inheritance of disease resistance in the common bean. Jour. Amer. Soc. Agron. 13: 15-32. 1921.—Crosses between varieties of beans resistant to α and β strains of *Colletotrichum lindemuthianum* and 1 susceptible to α strain only, indicate that resistance to α strain is due to a single factor and is dominant. Crosses between a variety resistant to both strains and 2 varieties susceptible to both strains showed a 2-factor basis for resistance to both strains of the anthracnose fungus. In F_2 a 9:7 ratio was obtained. Significant variations in individual F_2 families are said to be due to difficulty in obtaining uniform conditions for infection in large outside inoculation chamber. Crosses between Robust Pea bean, highly resistant to mosaic disease, and of Flat Marrow bean, which is very susceptible, indicate 2 factors in homozygous state necessary for complete susceptibility. Absence of both factors gives high degree of resistance. One plant in 16 of F_2 generation of 5272 plants was severely infected. All gradations between resistance and susceptibility occurred. Susceptibility showed only partial dominance. Crosses between Flat Marrow, resistant, and Robust Pea, susceptible to root rot (*Fusarium martii phaseoli*), indicated in

F₁ that susceptibility is partially dominant. A condition midway between that of plants showing greatest infection in any particular season and normal condition of healthy plants was chosen to separate classes. F₂ data were checked by growing F₂ families. A 2-factor basis in relation to root rot is indicated. Strains of commercial value resistant to both mosaic and root rot have been selected. On account of their parentage all of these should be resistant to β strain of *C. lindemuthianum*.—*J. P. Shelton*.

1931. MATHEWS, J. WRENFORD. Sheep and wool for farmers. Cross-breeding experiments. Results of lamb-raising trials. Agric. Gaz. New South Wales 31: 761-770, 846-852. 10 fig. 1920.—In previous experiments, rams of various long-wool breeds had been crossed with Merino ewes to determine which combination resulted in the greatest aggregate value of wool and mutton. None of the combinations produced lambs suitable for the export lamb trade. The present papers discuss in detail the results of crosses between rams of 3 short-wool breeds with ewes from 3 long-wool-Merino crosses. Good lambs were produced by all, but Dorset Horn rams sired consistently heavier lambs than Shropshires or Southdowns, and the Border-Leicester cross ewes were consistently superior to the Lincoln or Leicester crosses.—*Sewall Wright*.

1932. OSGOOD, WILFRED H. The turkey as a subject for experiment. Amer. Nat. 55: 84-88. 1921.—Author states that there is little genetic work under way "which can be correlated logically with the results of speciation and subspeciation as the field naturalist and taxonomist find them in nature." He thinks the 6 races or subspecies of the American turkey would furnish excellent material for this purpose. If it could be shown that the differences between these "behave as hereditary units without any such blending as requires 'dialectic gymnastics' to explain, it would be a long step forward in the correlation of natural and man-made experiments."—*William A. Lippincott*.

1933. PAYNE, FERNANDUS. Selection for high and low bristle number in the mutant strain "reduced." Genetics 5: 501-542. 3 fig. Nov., 1920.—In the 6th generation of selection for increase in scutellar bristles in a race of *Drosophila melanogaster* a male appeared with only a single bristle. Starting with the "reduced" strain originated by this fly, plus and minus selection lines were carried on by inbreeding for 60 and 65 generations, respectively, including counts of over 200,000 flies. As in results previously reported by author, in which similar selection lines were started from variations in wild stock, this selection isolated 2 distinct lines. The sorting process was clearly effective for about 18 generations, after which slight progress was made, although no somatic limit had been reached. Minus line continued to produce a few flies with 1 bristle; plus line, a few flies with no bristles. These 2 lines are shown to be genetically distinct by failure of return selections, by maintenance of their differences in mass cultures, and by crosses. It is concluded from linkage tests that a single sex-linked factor differentiates the "reduced" strain as a whole from wild strains; that plus and minus lines within the "reduced" strains differ genetically by 2 plus modifiers, 1 of which is in sex chromosome near miniature, the other in 3rd chromosome near sepia. These modifiers can be passed over to wild selection for high and low bristle number in *Drosophila*, and so produce an extra-bristle race. Author considers this investigation "another link in the chain of accumulating evidence in favor of the multiple-factor hypothesis as an explanation of the effects of selection in bisexual forms."—*E. Carleton MacDowell*.

1934. PELSENEER, PAUL. L'hybridation chez les mollusques. [Hybridization among mollusks.] Compt. Rend. Acad. Sci. Paris 168: 1056-1059. 1919.—Controlled observations of hybridization among mollusks, occasioned by designation in conchological literature of certain types of individuals as hybrids. In fluviatic forms copulation was observed in various combinations of *Limnaea*. Eggs, egg masses, embryos, and young exhibited exclusively maternal characters. Foreign sperm merely induces development without fertilization. Examination showed retention of an undivided polar body until gastrula stage. In reciprocal crosses of marine forms, *Pholas candida* (lamellibranch) \times *Patella vulgata* (gastropod), larvae conformed to maternal type. In reciprocal crosses of *Pholas candida* \times *Hermella*

alveolata (annelid), larvae were also exclusively maternal. Author concludes that true hybrids are not produced among mollusks. Even closely related and ill-defined species usually produce false hybrids exhibiting maternal characters, and only exceptionally are individuals found which appear to be true hybrids.—*R. E. Clausen*.

1935. PLOUGH, HAROLD H. Further studies on the effect of temperature on crossing over. Jour. Exp. Zool. 32: 197-202. 3 fig. 1921.—Since preliminary work on the 1st and 3rd chromosomes of *Drosophila melanogaster* had indicated that crossing over was not visibly affected by temperature changes, the author undertook experiments to determine why these chromosomes differed from the 2nd where a temperature above or below the optimum causes a significant increase in crossing over. The tests were made at a temperature of 31.5°C., and the crosses were between wild stock and mutant stocks of the 1st and 3rd chromosomes. The controls were kept at a temperature of 22-25°C. The F₁ were back-crossed to the original mutant stocks and the per cents of crossovers calculated. Practically the whole length of these 2 chromosomes was tested in this way. The experiments with the 1st chromosome showed that crossing over in this chromosome is not influenced by temperature or by the age of the female parent. The results with the 3rd chromosome were somewhat different. There was an increase in crossing over in this chromosome due to temperature, in only one region—the *sepia*-spineless. A variation in crossing over with the age of the female occurred also in this part of the chromosome only. Other regions of the chromosome were unaffected by temperature or age of the female parent. This same section, only, showed a relatively high rate of double crossovers. A similar phenomenon had been found to occur in the 2nd chromosome, where the region which showed high rate of double crossing over was influenced in the amount of crossing over by temperature or age of the female parent. The author interprets these results as indicating that regions where crossing over occurs less freely are the ones which are "sensitive" to the effects of environment.—*Mildred Hoge Richards*.

1936. RAWSON, H. E. Plant-sports produced at will. Proc. Linn. Soc. London 1919: 64-65. 1920.—Through "selective screening" experiments on various plants, such as *Tropaeolum majus* and *Papaver Rhoeas*, author claims to have secured sports and new varieties. By "selective screening," the author refers to a system of screening plants at selected intervals of daylight. Variations produced by this method are said eventually to have become hereditary or "fixed," that is, they appeared without "selective screening" in the open garden. A double variety of poppy is believed to have originated in this way. Sudden changes of color or structure were accompanied by sterility. "Selective screening" brings out latent potentialities and causes correlated variations. Work of GARNER and ALLARD [See Bot. Absts. 5, Entry 22] is said to support these views.—*Orland E. White*.

1937. RICHET, CHARLES, ET HENRY CARDOT. La transmission héréditaire des caractères acquis et l'accoutumance des microbes. [The hereditary transmission of acquired characters and the behavior of microorganisms.] Compt. Rend. Acad. Sci. Paris 171: 1353-1358. 1920.—A study of the resistance of lactic-acid bacteria to various chemical substances. A resistance was noted for potassium bromide, saccharose, vanadium, zinc, copper, and phenol; but the organisms became more and more sensitive to mercuric chloride. A specific resistance was developed in successive generations with respect to thallium nitrate, but this race was not resistant to other toxic substances. The development of resistance seems not to be a gradual process, but seems to occur suddenly in the manner of a mutation. These results seem to indicate that in the use of antiseptics, the same one should not be used continuously, but the different types should be alternated.—*Mrs. W. K. Farr*.

1938. RITZMAN, E. G. Breeding earless sheep. Jour. Heredity 11: 238-240. Fig. 31. 1920.—An account of the production of an earless type of sheep, at the New Hampshire Agricultural Experiment Station, by crossing 2 short-eared types. The short ears ranged below 2 $\frac{3}{4}$ inches in length and were formerly (Jour. Agric. Res. 6: 1916) reported to be the somatic expression of the pure dominant and of the heterozygote, assuming complete dominance. The later results reported show that the pure dominant is somatically earless and that the

short-eared type is the heterozygote. The earless type appeared in a cross between two short-eared parents.—*M. J. Dorsey.*

1939. SAFIR, SHELLEY R. Genetic and cytological examination of the phenomena of primary non-disjunction in *Drosophila melanogaster*. *Genetics* 5: 459-487. 1 pl., 2 fig. Sept., 1920.—Females of *D. melanogaster* having the 2 sex-linked recessive mutants, eosin eye-color and miniature wings, were out-crossed individually to wild males. The regular offspring of such a cross are wild-type daughters and eosin miniature sons. In addition to these there were produced a few exceptions,—eosin miniature daughters and wild-type sons (245 such cultures yielded: Wild-type ♀ 25,004, *w^m* ♂ 22,454, *w^m* ♀ 17, wild-type ♂ 70). The occurrence of such exceptions had been explained by BRIDGES (*Genetics* 1: 1-52, 107-163. 1916) as due to primary non-disjunction of the X chromosomes, i.e., at the reduction division the 2 X chromosomes failed to disjoin, and both remained in the egg or both were extruded to the polar body. The XX type of egg fertilized by a Y sperm gives the matroclinous daughters, and the no-X egg fertilized by X sperm gives the wild-type exceptional sons. Bridges had found 12 such exceptions in a total of 20,484 flies, or a frequency of 1 in 1708. In the cross of eosin miniature female the frequency was 1 in 547, or 3 times as high. The excess was largely of males, which may be accounted for by "elimination" of both X chromosomes at maturation. That the above exceptions were due to primary non-disjunction (rather than to secondary non-disjunction caused by an extra Y chromosome in the mother) was proved in 3 ways: The percentage of exceptions in the individual cultures was significantly lower than that characteristic of XXY females; none of the regular daughters in the exception-producing cultures gave secondary exceptions, although half of them should have done so had the exceptions themselves been secondary; the exceptional sons were invariably sterile, as had been found by Bridges to be characteristic of primary exceptional males. The frequency of primary non-disjunction was tested for 2 other stocks, and was found to give 1 exception in 1453 in the white, and 1 in 1210 in the vermilion. The tests of Bridges and of Safir gave a total of 180,022 flies of which 163, or 1 in 1104, were primary exceptions. It seems probable that the relatively high percentage of exceptions given by the eosin miniature stock was due to a recessive genetic difference. The fact that the primary exceptional male is sterile was proved by extensive tests. Microscopical examination of the testes showed that sperm was scanty and non-motile. The cytoplasm of the cysts was found to be syncytial; the compactness of the bundles of sperm and their non-motility may be a consequence of this difference. The constitution of the primary exceptional males was proved to be XO by direct cytological examination; the spermatogonial cells, in the few clear cases, contained an unpaired rod-shaped X chromosome, with no J-shaped Y chromosome present.—*Calvin B. Bridges.*

1940. SAUNDERS, E. R. On conceptions of the processes of heredity. *Nature* 106: 224-227, 255-258. 1920.—Reduplication theory of BATESON and PUNNETT is contrasted with chromosome theory of MORGAN—the latter reviewed in considerable detail. Case is cited of double-throwing Stocks, which is taken as typical of numerous instances in plants where factorial segregation appears to be premeiotic. Significance of cytoplasm vs. nucleus in hereditary mechanisms is discussed. The author reaches the following general conclusions: Special hereditary processes cannot be attributed to cytoplasm as distinct from nucleus; there is little doubt that in animals the chromosomes represent distributional mechanism, and similarly in plants for such cases as *Drosera*, *Primula*, *Oenothera*, etc.; general applicability of conception of crossing-over is doubtful; in plants, as contrasted with animals, segregation may take place elsewhere than at the recognized reduction division.—*T. H. Goodspeed.*

1941. SEARS, PAUL B. Variation in *Taraxacum*. *Science* 53: 189. 1921.—The suggestion is made that the variation in the amount of dissection of leaves in *Taraxacum* is correlated with age of rosette.—*A. K. Peitersen.*

1942. STAPLEDON, R. G. Plant breeding work at Aberyswyth. *Jour. Ministry Agric. Great Britain* 27: 630-639. 1920.—A popular discussion.—*H. K. Hayes.*

1943. STOUT, A. B. A graft chimera in the apple. Jour. Heredity 11: 233-237. Fig. 28. 1920.—Two types of apples appear on a tree which has never been top-grafted. One type is typical of King and the other is nearly identical with the Roxbury Russet. Chimeral fruits having a King sector with the remainder Russet furnish evidence that this instance is not due to top-working. Mixed tissues are also found in twigs and leaves. It is probable that this chimera developed from a bud that arose on the line of contact between scion and stock and is hence to be considered a graft-chimera. It is possible that some of the fruits show a periclinal relationship.—M. J. Dorsey.

1944. STURTEVANT, A. H. Genetic studies on *Drosophila simulans*. I. Introduction. Hybrids with *Drosophila melanogaster*. Genetics 5: 488-500, 5 fig. Sept., 1920.—Author relates circumstances leading to the discovery of *D. simulans* Sturtevant as a species common and very similar to *D. melanogaster* Meigen. He describes differences between the 2 species, and presents the results of crosses between normal males of each species mated to females of the reciprocal species. Normal females were used, and also females that, as a result of non-disjunction, carried a Y chromosome as well as the two X chromosomes. Odd sex ratios are usual in the progeny of all matings between these species. The following postulate is found to account for the results: "In general, it appears that hybrids develop only if they carry a *simulans* X, but that in the presence of *simulans* cytoplasm a *melanogaster* X usually inhibits development even though a *simulans* X is also present." The hybrids are intermediate to their parents in appearance and are sterile. Author describes distributional range of *D. simulans*, comments on sex ratios in hybrid progeny of other groups of animals, and closes with a paragraph on sexual selection in these species of *Drosophila*.—John S. Dexter.

1945. SWINGLE, WILBUR WILLIS. The germ cells of Anurans. I. The male sexual cycle of *Rana catesbeiana* larvae. Jour. Exp. Zool. 32: 235-331. 15 pl., 2 fig. 1921.—The present paper is the first of a series upon the history of germ-cells of Anurans. Sexual cycles are described in male tadpole of bull-frog, *Rana catesbeiana*, which usually exists as tadpole for 2 years. Two cycles occur, the 1st during the 1st year, the 2nd during the 2nd year, just before metamorphosis. Germ-cells of 1st cycle arise from primordial germ-cells, pass through maturation stages as far as metaphase of 1st division, after which the cells degenerate at once or form spermatid-like cells which degenerate. The 28 chromosomes and 14 tetrads strikingly duplicate those of the Urodeles in their appearance, size, and behavior. The 2nd cycle takes place in cells which are products of prolific and rapid multiplication of a few primordial germ-cells which did not participate in the 1st cycle, and possibly also of germinal epithelial cells. This cycle gives rise to normal mature sperm at time of metamorphosis. These cells and their chromosomes are much smaller than those of 1st cycle and are typical of adult Anurans; this difference is due possibly to rapid succession of divisions producing them, and to loss of water in metamorphosis. Metamorphosed males continue to produce sperm until large enough to copulate. Author predicts a similar abortive cycle for female, now under investigation. A still more precocious abortive cycle for *Rana pipiens* and the toad is reported. History of germ-cells of other vertebrates which also possess an abortive cycle is reviewed. These precocious abortive cycles are interpreted as another case of "recapitulation of the germ-cell cycle to past phylogenetic sexual conditions when vertebrates ripened their sexual products at an earlier developmental stage than at present." The above history is an important consideration among Europeans in determining the sex of tadpoles, which is also to be discussed later.—C. L. Parmenter.

1946. SWINGLE, W[ILBUR] W[ILLIS]. Neoteny and the sexual problem. Amer. Nat. 54: 349-357. 1920.—The present paper is preliminary to a series of papers upon sex of Anuran tadpoles and their sexual cycle. From a study of the gonads of tadpoles of *Rana catesbeiana* (bull-frog) which metamorphoses usually during the 2nd year, author concludes that R. HERTWIG, KUSCHAKEWITZ, and WITSCH misinterpret meaning of sexual cycle in European frogs, that the tadpoles are not at first largely females with a few hermaphrodites,—from both of which males later develop,—but that both male and female tadpoles exist in equal numbers. Error exists in the assumption that the behavior of tadpole germ-cells parallels

that of many mammals in which the female cells undergo early stages of maturation before birth, while those of males delay until near sexual maturity. Author observes that both male and female tadpoles undergo early maturation stages simultaneously. Cells of male undergo 2 cycles: First cycle during 1st year reaches 1st maturation division and aborts; 2nd cycle during 2nd year produces mature sperm just before metamorphosis. Pachytene cells of female tadpole enter growth stage and become typical oocytes. So-called "oocytes" in male tadpole and newly metamorphosed frog arise during growth stage but later degenerate. Presence of yolk-bearing cells is not a good sex criterion since male cells of *Ascaris* and the Prosobranchs form yolk. Author suggests that "oocytes" are of same nature as cells of Bidder's organ, that due to precocious sexual cycle some germ-cells not able to complete their cycle grow to an abnormal size and appear as oocytes.—*C. L. Parmenter.*

1947. THOMPSON, DAVID H. **A new type of sex-linked lethal in *Drosophila*.** [Abstract.] *Anat. Rec.* 20: 215. 1921.—A new sex-linked recessive factor has appeared which kills females in double dose and can be recognized in the males which it does not kill. In these males it affects the mesothorax since the wings are held erect and the 2nd pair of legs is feeble. Crosses between heterozygous females and erect males give a sex ratio of 1 female to 2 males while other lethals give ratios of 2 females to 1 male. Linkage experiments indicate a locus of about 38 in the sex chromosomes. The lethal effect and the character "erect" are manifestations of the same factor as indicated by the absence of crossing over between the two. This erect lethal kills females homozygous for it while other sex-linked lethals kill males. The possibility is offered of producing balanced lethals in the sex chromosomes. Recently a dominant accessory factor has appeared which makes erect dominant in the heterozygous females.—*David H. Thompson.*

1948. THOMSON, J. ARTHUR. [French rev. of: CASTLE, W. E. **Studies of heredity in rabbits, rats and mice.** Carnegie Inst. Washington Publ. 288. 56 p., 3 pl. 1919.] *Scientia* 29: 142-144. 1921.

1949. THOMSON, J. ARTHUR. [French rev. of: MORGAN, T. H., AND OTHERS. **Contributions to the genetics of *Drosophila melanogaster*.** Carnegie Inst. Washington Publ. 279. 388 p., 12 pl., 105 fig. 1919.] *Scientia* 29: 144-145. 1921.

1950. TISCHLER, G. [German rev. of: OSTENFELD, C. H. **Kimdannelse uden befrugtning og Bastarddannelse hos nogle Kuryblomstrede samt disse Forholds Betydning for formernes constans.** (Studies on fertilization and hybridization in Compositae and their significance for the production of constant forms.) *K. Vet. og Landbohjiskole Aarskr.* 1919: 207-219. 1 fig. 1919.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 25: 176. 1921.

1951. WEINSTEIN, ALEXANDER. **Homologous genes and linear linkage in *Drosophila virillis*.** *Proc. Nation. Acad. Sci.* 6: 625-639. 2 fig. Nov., 1920.—Author describes "cross-veinless," a sex-linked mutant character in *Drosophila virilis* which constitutes a 3rd possible parallel to sex-linked characters in *Drosophila melanogaster*. Data are given on linkage of factors for crossveinless and hairy with other factors; also evidence of linear linkage as opposed to 3-dimensional linkage in this species. Data are presented on coincidence, indicating that coincidence resembles that in X chromosome of *D. melanogaster*. Author discusses question of "homology of apparently similar factors" and answers the question "are genes with similar somatic effects chemically similar?" in the negative.—*C. W. Metz.*

1952. WELLINGTON, R. **Recent investigational work with the tomato.** *Trans. Peninsula Hort. Soc. [Delaware]* 9: 73-76. 1920.—Author notes that F₁ seed usually gives a greater yield than either parent and produces a uniform product. An objection is that crossed seed must be used each season. Method of producing crossed seed is given.—Work of previous investigators is reviewed, all of whom obtained increased yields in F₁ over the parent varieties.—In experiments conducted at Minnesota, 1911-1918, the average increase was nearly 4 pounds per plant, including green and ripe fruit, but not all crosses were equally productive,

nor did all give the same increase each season. Smoothness and earliness are additional factors noted as a result of the cross.—Important difference between yield of same strain in different years is noted, also the importance of regulating plantings to suit weather conditions. Author cites results secured with wilt-resistant varieties originated by the United States Department of Agriculture and the Maryland Agricultural Experiment Station.—*C. E. Myers.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 1584, 1595, 1599, 1705, 1712, 1724, 1811, 1824, 1858, 1891, 1910, 1922, 2002, 2013, 2101, 2112, 2120, 2122, 2129, 2138, 2181, 2189, 2192, 2223, 2249)

FRUITS AND GENERAL HORTICULTURE

1953. ANONYMOUS. Apple—Maidstone Favorite. *Jour. Pomology* 1: 61–62. *Pl. 1*. 1919.—A technical description of a promising variety of apple originating as a seedling and raised by Messrs. George Bunyard and Co., Ltd.—*L. H. MacDaniels.*

1954. ANONYMOUS. The first year under quarantine. *Amer. Nurseryman* 33²: 32, 35. 1921.—A report is given on the working of Quarantine 37 for the first year of its operation. Data show that there were practically as many fruit stocks imported under the quarantine measure as during the year previous. While such stock is not under quarantine, it however refutes the argument that foreign growers had refused to sell to American importers as a retaliation for Quarantine 37. Data and other facts regarding the law are incorporated in this report.—*J. H. Gourley.*

1955. ANONYMOUS. The patenting of new fruits. *Jour. Pomology* 1: 50–53. 1919.—There is a strong movement in France to pass laws giving the originator of a new variety exclusive rights to its propagation for a period of years as a recompense for his labor. Such a movement is objected to because in the case of fruits it would be impossible in many cases to tell whether the variety is new or merely an old one rediscovered, or a seedling which has come true to type. It is of greater advantage to the originator to have the advertisement that comes from the introduction of his discovery by well established nurseries than to have the temporary financial gain from independent propagation.—*L. H. MacDaniels.*

1956. ANONYMOUS. The pomological conference at Metz, Sept. 4th, 1919. *Jour. Pomology* 1: 59–61. 1919.—A short account of the conference, with brief comment.—*L. H. MacDaniels.*

1957. ANONYMOUS. A review of "Fruit Culture and Science." By the Duke of Bedford and Spencer Pickering. [Macmillan and Co.: London, 1919. *xix* + 348 p., 47 fig.] *Jour. Pomology* 1: 41–49. 1919.—A summary of the book in question with some adverse criticism of the manner of conducting the experiments and the interpretation of data. The author is further criticized for not giving sufficient weight to the effect of stock on scion and variation in the growth habit in varieties. The criticism is for the most part favorable. The part played by Mr. Pickering in horticulture is likened to that played by Bernard Shaw in politics and ethics. Whatever else he may have done he has aroused us from our lethargy.—*L. H. MacDaniels.*

1958. BECKWITH, CHARLES S. A complete cranberry fertilizer for Savanna bottom. *Proc. Ann. Meeting Amer. Cranberry Growers' Assoc.* 50: 5–7. 1920.—As a result of tests extending from 1913 to 1918 the following tentative formula for a fertilizer for cranberries on Savanna land is advised: 75 lbs. nitrate of soda, 75 lbs. dried blood, 300 lbs. rock phosphate, and 50 lbs. sulphate of potash. In 1919, tests were made with different amounts per acre of this mixture with varying amounts of acid phosphate. The heaviest yield followed an application

of 800 lbs. of the above mixture with 150 lbs. acid phosphate, a 24 per cent increase over the unfertilized plot. Increasing the amount to 1050 lbs. plus 800 lbs. acid phosphate increased the yield only 12 per cent, and the berries were oversized and soft.—*J. K. Shaw.*

1959. BERGMAN, H. F. Observations on the accumulation of carbon dioxide from straw-berries in refrigerator cars. *Science* 53: 23. 1921.—During the years 1918 and 1919 the writer made observations on the CO₂ and O₂ content of air in refrigerator cars, and the effect of ventilation on the accumulation of CO₂. In the tests of 1918, berries were loaded at a temperature of about 68–70°F., and one car was ventilated by raising the hatches at diagonal corners of the car. In the tests of 1919, the berries were loaded at a temperature of 76–78°F., and one car was ventilated by raised hatches. From the table it is apparent that there is no great accumulation of CO₂ in the air of unventilated cars in transit. The maximum of 2.5 per cent dropped to 0.7 per cent when the car was iced, and again increased to 1.3 per cent, never exceeding this amount during the remainder of the journey. In ventilated refrigerator cars the percentage of CO₂ is lower. It may, while the cars are standing, become nearly or quite as great as in unventilated cars, but when the cars are moving it drops to 0.2–0.4 per cent. It is concluded that the accumulation of CO₂ in unventilated refrigerator cars is apparently not sufficient, in the case of strawberries, to cause injury to the berries.—*A. H. Chivers.*

1960. BERGTHOLDT, J. E. President Bergtholdt's address to the Californians. *Amer. Nurseryman* 33: 8. 1921.—This address consists largely of suggestions for the betterment of the California Association of Nurserymen but it includes statements to justify the high price of nursery stock. Data are presented to show that California-grown fruit trees are cheaper than eastern-grown stock of the same size and quality.—The nurserymen cannot, on the average, secure a yield of trees greater than 70 out of 100 planted, and out of the 70 not more than 49 will, over a period of years, be sold. This loss of over 50 per cent must be absorbed by the trees that are actually sold; this in part explains the high price of nursery stock.—*J. H. Gourley.*

1961. BUNYARD, EDWARD A. The length of stem in pears and apples. *Jour. Pomology* 1: 20–22. *Fig.* 1919.—Fruits borne at the center of a cluster, in the case of apples, or at the tip of the cluster base, in the case of pears, have shorter stems than those borne laterally. The great variation in the length of stem within a variety renders this character of little value in the classification of varieties.—*L. H. MacDaniels.*

1962. BUNYARD, EDWARD A. Seedling apples—a record of some growers' experiences. *Jour. Pomology* 1: 110–115. 1920.—A discussion of some of the results of apple breeding experiments in England, Canada, and the United States. It is concluded that most of the varieties that have been used in crossing behave as if genetically pure, and transmit their characters to the seedling. A method of bringing seedlings into early bearing by cutting the tap root is briefly described.—*L. H. MacDaniels.*

1963. CHAMBERS, F. S. Report of the research committee of the American Cranberry Growers' Association. *Proc. Ann. Meeting Amer. Cranberry Growers' Assoc.* 50: 7–10. 1920.—Investigations conducted since 1913 appear to indicate that various cranberry soils have different degrees of acidity. Cranberries will grow well in soils of slight acidity, also in soils that are very acid. Red-root (*Ceanothus americanus*) and double-seeded millet can apparently tolerate a greater acidity than the cranberry.—*J. K. Shaw.*

1964. CHASSET, L. En culture fruitière intensive: croisillon et gobelet nain; comparaison des deux formes. [Comparison of the cross-bar and dwarf-goblet forms in intensive fruit culture.] *Rev. Hort.* 92: 191–192. 1920.—When spaced 2 meters apart, the cross bar type of tree would possess, when developed, 33,200 meters of wood capable of carrying fruit-spurs, whereas the goblet type would possess 50,000 meters. On rich soils, however, it would be necessary to space the goblet-form trees 3 meters apart, in which case the length of spur-producing wood would be reduced to 33,000 meters, but all of this would be advantageously

exposed to light and air. The latter type is a desirable form for plum, cherry, and peach trees.—*E. J. Kraus.*

1965. DURHAM, H. E. The recognition of fruit—graphic records. *Jour. Pomology* 1: 28-36. *Fig. 2-4.* 1919.—The author emphasizes the necessity of uniform and accurate methods in making graphic records in the description of varieties of apples and pears. Longitudinal, transverse, and crown sections should be made, the last named to pass through the blossom end just below the calyx. The calyx, calyx tube, position of stamens, core fruit, and "axial sac," or intercarpellary space, are considered to be important characters. A method for tracing fruit outlines without cutting specimens is given.—*L. H. MacDaniels.*

1966. GOULD, W. M. Production of nursery stock. *Amer. Nurseryman* 33: 44, 46. 1921.—A detailed discussion of the practices in the nursery.—*J. H. Gourley.*

1967. GUILLAUMIN, A. Citranges, limonanges, satsumanges. *Rev. Hort.* 92: 157-159. *Fig. 54.* 1920.—The author characterizes further some of the known *Citrus trifoliata* crosses and summarizes those known to date as follows: *Triptera* × *Bigaradier* = Citrange stock; Orange × *Triptera* = Citranges Armand Bernard, Rusk, Montauban improved; *Triptera* × Orange = Willist citrange; Lemon × Citrange = Montauban Limonage; *Triptera* × *Satsuma* = Norman Satsumange; Citrange × Citrange. [See also *Bot. Absts.* 7, Entry 1911.]—*E. J. Kraus.*

1968. HATTON, RONALD G. Black currant varieties—a method of classification. *Jour. Pomology* 1: 65-80, 145-154. *Fig. 5-15, 17-26.* 1920.—All varieties of black currant are derived from the single species *Ribes nigrum* Linn. The nomenclature of the horticultural varieties has been greatly confused. It is important to correct this because of the great variation in the varieties as to disease and pest resistance, bearing, adaptability to soil types, etc. Varieties are divided into the "red bud" and "whitish bud" types on the basis of bud color, and each type into two groups on the basis of growth habit, bud characters, season of flowering, and minor differences in inflorescence, flower, leaf, and fruit. The most prolific variety is the Baldwin, which has as its chief defect susceptibility to gall mite infection.—A review of literature is included.—*L. H. MacDaniels.*

1969. HEINE. Düngungsversuche im Obstbau. [Fertilizer experiments in fruit culture.] *Mitteil. Deutsch. Landw. Ges.* 36: 97-100. 1921.—A general discussion of facts to be considered in carrying on fertilizer experiments with fruit trees. From experiments conducted at Dahlem, the author concludes that at least 12 trees should be selected for every treatment proposed.—*A. J. Pieters.*

1970. HOOPER, CECIL H. Notes on insect visitors to fruit blossoms. *Jour. Pomology* 1: 116-124. 1920.—Honey bees are the most frequent visitors of fruit blossoms of all kinds in England. In the case of apple blossoms they comprise about 70 per cent of the visitors, bumble bees, other wild bees, and flies being next in order. Bees, because of their hairy coats, are considered better pollen carriers than beetles or ants. Lists of insects visiting fruit blossoms in Germany are copied from the work of Hermann Müller.—*L. H. MacDaniels.*

1971. KEEBLE, FREDERICK. Intensive cultivation. *Nature* 106: 293-296. 1920.—Production of vegetables, fruits, and potatoes under war time conditions is discussed.—*O. A. Stevens.*

1972. LAXTON, EDWARD. On raising seedling apples. *Jour. Pomology* 1: 104-109. 1920.—A brief account of the apple breeding work of the author and his brother. About 500 crosses were made and 5000 seedlings raised. Eighty of the most promising crosses are listed and briefly described. Many of the seedlings have much of the flavor and quality of Cox's Orange, a variety used in most of the dessert crosses. Crossing dessert and cooking varieties was found unsatisfactory in practically every case.—*L. H. MacDaniels.*

1973. MERCIER, C. **The electrification of seeds.** Sci. Prog. [London] 13:482-485. 1919.—More than 2000 acres have been planted with electrified seeds of different kinds. This treatment has been found to be very beneficial and has resulted in an increase in yield, in weight per bushel of the seed, in the length and strength of the straw, and in the number of plants from each seed. Every kind of seed requires a special treatment, the details of which have not all been worked out. The rationale of the process is unknown.—J. L. Weimer.

1974. MOREL, F. **Vignes des jardins et raisins de table.** [Garden vines and table grapes.] Rev. Hort. 92: 219. 1920.—Attempts to produce grape vines resistant to attacks by fungi and at the same time productive of high quality fruits are meeting with fair success. The selection of new forms should be severe, retaining only the best.—E. J. Kraus.

1975. POPENOE, WILSON. **The Colombian berry or giant blackberry of Colombia.** Jour. Heredity 11: 195-203. Fig. 1-4. 1920.—An account of a hitherto unknown species of *Rubus* from Colombia, South America, of great interest to horticulturists and fruit breeders. The fruit sometimes reaches a length of $2\frac{1}{4}$ inches and the plant makes a strong vigorous growth. The color of the berry is light crimson turning to a wine color when overripe. The quality is not high but selection may bring out superior varieties. While the species has not been determined it was thought to be *R. roseus*. The plant prefers a moist, cool climate and will probably be of most value in the southern states in the U. S. A.—M. J. Dorsey.

1976. RIDER, A. J. **Studies in cranberry culture.** Proc. Ann. Convention Amer. Cranberry Growers' Assoc. 51: 1-3. 1920.

* 1977. ROSS, J. C., AND S. W. VAN NIEKERK. **The manuring of vineyards.** Jour. Dept. Agric. Union of South Africa 2: 163-169. 1921.—Various formulae, all calculated to supply standard quantities of nitrogen, phosphoric acid and potash are given with costs. Attention is called to the fact that different soils vary in fertilizing requirement and a simple plan is suggested by which the vineyardist may test the needs of his own soils. On sour soil lime is needed.—A. J. Pieters.

1978. TABOURY, M. F. **Injections dans les plantes pour augmenter leur rendement.** [Injections in plants to increase fruit returns.] Nat. Canadien 47: 145-146. 1921.—An old pear tree which flowered but did not fruit was subjected to the following treatment: A little above the ground the trunk was perforated to the vascular bundles, and a small glass tube inserted communicating with 18 l. of a solution containing 19 gr. FeSO_4 and 10 gr. NaNO_3 ; the tree absorbed the solution in about 3 days. The following month the leaves were larger and more vigorous than those of 2 untreated trees, and the tree produced numerous fruits, while the control trees produced none.—In 1913, M. CALVINO similarly employed on a sterile pear tree the following solution: H_2O 20 l., super-phosphate 5 gr., K_2SO_4 5 gr., NaNO_3 5 gr., and FeSO_4 5 gr. The tree absorbed 50 l. of the solution just before flowering, with good effect in flowers and fruitage. A lilac grafted on privet and similarly treated, had a much more vigorous and abundant bloom than usual.—A. H. MacKay.

1979. TERRY, H. B. **Pruning of deciduous fruit trees.** Jour. Dept. Agric. Union of South Africa 2: 177-184. 1921.—Practical directions, with illustrations, for pruning so as to give trees the "goblet" or "vase" form said to be the best form for South African conditions.—A. J. Pieters.

1980. TRIBOLET, I. **The pecan nut.** Jour. Dept. Agric. Union of South Africa 2: 129-132. 1921.—The culture of the pecan nut is discussed and it is suggested that the growing of the pecan might prove highly remunerative in parts of South Africa, especially in Natal.—E. M. Doidge.

1981. TRIBOLET, I. Walnuts. Jour. Dept. Agric. Union of South Africa 2: 80-81. 1921.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1982. ANONYMOUS. The American holly. Nation. Nurseryman 29²: 33. 1921.—This plant has withstood the smoky atmosphere of St. Louis better than most other plants. "For a city evergreen the holly is therefore recommended above all other evergreens on account of its smoke-resisting qualities."—Attention is called to the general dioecious habit of the plants and the consequent necessity of planting staminate and carpellate trees close together in order to secure pollination.—*J. H. Gourley.*

1983. ANONYMOUS. Native plants at the National Botanic Gardens. South African Gard 11: 11, 45. 3 fig. 1921.

1984. ANONYMOUS. Note. [Rev. of: PEMBERTON, J. H. Roses: their history, development and cultivation. 2 ed., xxiv + 334 p., 9 pl. Longmans Green and Co.: London, 1920.] Nature 106: 371. 1920.

1985. ALBERT, C. Le fenouil de Florence: 11 Fenocchio. [Fennel from Florence, 11 Fenocchio.] Rev. Hort. 92: 220. Fig. 56. 1920.—Differing from the common fennel, the leaf bases of this variety produce a scaly bulb, the interior of which is tender and edible. It is used in either the cooked or uncooked state. Seeds sown in March produce marketable plants in June and July, while those sown in September yield large plants the following April.—*E. J. Kraus.*

1986. ENFER, V. Chauffage des serres: les lignites et la tourbe. [Heating greenhouses: lignites and peat.] Rev. Hort. 92: 218-219. 1920.—Both of these materials may be used as substitutes for coal, the latter when used in conjunction with coal or when made into briquettes, is a good fuel. Large quantities of peat are available at many places in France.—*E. J. Kraus.*

1987. ENFER, V. Utilisation des serres avec chauffage: production des légumes. [Utilization of greenhouses with heat; production of vegetables.] Rev. Hort. 92: 195-196. 1920.—Specific suggestions on growing various crops.—*E. J. Kraus.*

1988. GADECEAU, E. Le drapeau belge: Abutilon megapotamicum. [The Belgian flag—A. megapotamicum.] Rev. Hort. 92: 214-215. 1 pl (colored). 1920.—This form is dedicated to King Albert I of Belgium because the colors of the flower are arranged as are those of the Belgian flag; the calyx is red, the corolla yellow, and the stamen mass brown-black. The plant is free flowering and of easy culture.—*E. J. Kraus.*

1989. HEEDE, A. VAN DEN. Les plantes vivaces et rustiques: les juliennes a fleurs doubles. [Perennial and hardy plants: double flowered Hesperis.] Rev. Hort. 92: 198. 1920.—The single flowered forms of *Hesperis matronalis* generally persist from year to year. The white, double flowered form, however, usually dies out the 2nd year following planting. This difficulty can be completely avoided by dividing the old plants in August, or by making cuttings from the stems, and transplanting to a new situation.—*E. J. Kraus.*

1990. KRELAGE, E. Nouvelles tulipes hybrides. [New hybrid tulips.] Rev. Hort. 92: 196-197. 1 pl (colored). 1920.—Systematic hybridizing of tulips was undertaken 20 years ago. Crossing *Tulipa retroflexa* with a rose colored Darwin tulip resulted in a variety, Sirène, with distinctly reflexed petals, flowering for the first time in 1908. Other varieties with similar lily-like flowers, in various colors, are being produced each year. Three other distinct groups of varieties are listed as follows: (1) Pure white forms particularly adapted for forcing; (2) forms possessing absolutely new colors or attractive combinations of colors; (3) yellow varieties of the true globular Darwin type, of which none existed previously. Many of the varieties are still on trial, many hundreds have been discarded, and each year many new seedlings bloom for the first time.—*E. J. Kraus.*

1991. LAMBERT, F., ET P. PÉRONNE. *Le Tchê* (*Cudrania Triloba*, Hance). [*Cudrania triloba*.] Ann. École Nation. Agric. Montpellier 17: 81-104. Fig. 1-10. 1918 [1919].—*Cudrania* is a small tree or shrub with thorns. It was found that the mulberry silk worm which eats the leaves of *Cudrania* is less susceptible to disease. Its roots contain a yellowish-red coloring matter which can be easily extracted. As a hedge plant it is valuable because of its thorns. It thrives where the mulberry grows but prefers deep cool sandy soil. It is propagated easily by root cuttings or by layering.—F. F. Halma.

1992. LESOURD, F. *Trois nouveaux lauriers roses*. [Three new oleanders.] Rev. Hort. 92: 216-217. Fig. 56-57. 1920.—The varieties Rochelais, Single Crimson; Botaniste Faideau, Double Rosy White, with the backs of the petals rose lilac; and Aunissien, double rose lilac, are described and the characteristics noted.—E. J. Kraus.

1993. MOTTET, S. *Un nouveau Liquidambar, L. formosana* Hance. [A new Liquidambar.] Rev. Hort. 92: 192-194. Fig. 55. 1920.—This species, though long known botanically, has scarcely been used as an ornamental. The young trees grow rapidly, develop attractive colors in autumn, and should prove useful along avenues or in groups.—E. J. Kraus.

1994. PHILLIPS, E. P. *Crotalaria Agatiflora*, Schwenif. South African Gard. 10: 457. 1 fig. 1920.

1995. ROLET, A. *Le froid artificiel régulateur des marchés dans le commerce des fleurs coupées*. [Refrigeration, a regulator of the cut flower trade.] Rev. Hort. 92: 190-191. 1920.—The need, expense, and use of precooling stations and refrigerator cars are discussed.—E. J. Kraus.

1996. VACHEROT, M. *Vanda Sanderiana*. Rev. Hort. 92: 213-214. Fig. 55. 1920.—Historical and cultural notes.—E. J. Kraus.

1997. WARNAAR, W., EN YAN ROES. *Verslag van de Commissie bot het bestudeeren van den toestand van den bloembollenteelt in Engeland*. [Report of the committee to study bulb raising in England.] Weekbl. Bloembollencult. 30: 13-16. 1919.—The reports of a series of studies on bulb growing in England are given, especially with reference to the culture, pests, and diseases.—J. C. Th. Uphof.

1998. WYMAN, L. *Tree planting in Texas towns and cities*. Texas Agric. Exp. Sta. Forest. Bull. 11. 39 p., 10 fig. 1920.—Information is given as to kinds of trees adapted to wide and narrow streets, to open lawns, and to different sections of the state.—A map of the state showing counties is divided into 5 regions. Trees suitable for each region are listed.—A table of 83 trees is given, listing the common name, scientific name, rate of growth, length of life, value for street planting, width of street to which adapted, and desirable features. A few pages are devoted to the care of the tree, diseases, and pruning.—Texas dealers in shade trees are listed.—L. Pace.

VEGETABLE CULTURE

1999. LAMPROY, E. *Culture de la pomme de terre dans la mousse*. [Potato culture in moss.] Rev. Hort. 92: 214. 1920.—Tubers of early varieties placed in pots of fresh moss and kept moist by watering every 2 or 3 days will yield a few tubers in about 1½ months. No fertilizer is used. The method is for amateurs only.—E. J. Kraus.

2000. WEIRUP. *Gemüsesorten*. [Varieties of vegetables.] Mitteil. Deutsch. Landw. Ges. 35: 663-664. 1920.—The author gives a list of the best varieties of peas, beans, carrots, cabbage, and onions.—A. J. Pieters.

2001. YOUNGKEN, HEBER W. *Studies on the Cassaba and Honey Dew melons*. Amer. Jour. Pharm. 93: 104-115. Fig. 12. 1921.—An investigation into the origin, history, struc-

ture, and chemical constitution of two cucurbitaceous fruits, namely, "Cassaba" and "Honey Dew Melon." Both melons undoubtedly belong to the group known as the *Inodorous* variety of *Cucumis melo*. This species contains an extraordinary number of varieties and strains, arranged in ten groups as follows: Canteloups, brodes, sucrons, melons d'hiver, ser-pents, forme de concombre, Chito, Dudain, rouges de Perse, and sauvages; each of these groups contains varieties or nearly allied races. The Cassaba melon, also known as "Kas-saba," "Casaca," "Casabad," and "Casba," was named for the town of Kassaba, about 15 or 20 miles from Smyrna, where it was extensively grown and whence it was introduced into this country. Hundreds of acres are now grown each year in the San Fernando valley of southern California. The Honey Dew melon is an old renamed winter melon from the south of France. It is grown quite extensively at the present time in Colorado. The paper is well illustrated by a series of photographs of the entire fruits and of fruits in cross section, as well as a number of sketches of the histological characteristics. A chemical analysis is also included.—*Anton Hogstad, Jr.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1826, 1869, 1888, 1905, 2001)

2002. BLAUW, A. H. Over de periodiciteit van *Hyacinthus orientalis*. [On the periodicity of *Hyacinthus orientalis*.] Mededeel. Landbouwhoogeschool Wageningen 17: 1-82. Pl. 1-5, fig. 1-46. 1920.—The periodic development in leaf formation, flower formation, and the extension of rest periods are considered. During the leaf-formation period in April a bud lies against the flower stalk, implanted on the disc in the axil of the innermost of the assimilating leaves. The earliest evidence of the bud dates from the end of the July of the previous year, and this bud forms the leaves which will function 2 years later. It consists of a few leaf primordia round a growing point. Of these, the 2 outer will not develop into foliage leaves but into scale leaves, remaining in the bulb. Such scale leaves and the basal parts of the foliage leaves become scales of the bulb.—Flower formation takes place during the leaf forming period in June, and the growing apex at that time is still low and flat. After the leaves and roots have died and the bulbs have been dug, the growing point of the inflorescence rises and reaches a length of 300-400 μ . No outward differentiation is visible. Soon the flower primordium appears as a shallow groove on the wall which is to become the bract. At the end of August several flower primordia appear, each with a floral bract. At the beginning of September the 3 carpels are differentiated but are still open; they close at the end of September. During late October, the reduction division of pollen mother cells takes place. In dry-lying bulbs, a resting period now takes place. Low temperature during the growing season greatly retards the development of floral and vegetative parts.—*J. C. Th. Uphof.*

2003. CAMMERLOHER, HERMANN. Der Spaltöffnungsapparat von *Brugmansia* und *Rafflesia*. [The stomata of *Brugmansia* and *Rafflesia*.] Österreich. Bot. Zeitschr. 69: 153-164. Pl. 3, fig. 1-5. 1920.—Stomata are present in lower epidermis of perianth in both forms, absent on other leaves. Upper surface is composed of small irregular cells, with occasional hairs; lower epidermis is smooth, with distinct layers of cuticle. Stomata of *Brugmansia* have 2, 3, or 4 guard cells; those of *Rafflesia* are typically 4-celled. Many stomata are abortive and it was not determined whether any performed functions of stomata or not.—*E. M. Gilbert.*

2004. COULTER, J. M. Embryogeny in angiosperms. [Rev. of: SOUÈGES, R. (1) Embryogénie des Liliacées. Développement de l'embryon chez l'*Anthericum ramosum*. (Embryogeny of the Liliaceae. Development of the embryo of *Anthericum ramosum*.) Compt. Rend. Acad. Sci. Paris 167: 34-36. 1918 (see Bot. Absts. 2, Entry 484). (2) Embryogénie des Poly-

gonacées. Développement de l'embryon chez le *Polygonum Persicaria*. (Embryogeny of the Polygonaceae. Development of the embryo in *Polygonum Persicaria*.) Compt. Rend. Acad. Sci. Paris 168: 791-793. 1919 (see Bot. Absts. 5, Entry 581.) Bot. Gaz. 68: 486. 1919.

2005. CUTTING, E. M. [Rev. of: CHURCH, A. H. On the interpretation of phenomena of phyllotaxis. Bot. Mem. [Oxford] 6. 58 p. 1920 (see Bot. Absts. 9, Entry 337).] Sci. Prog. [London] 15: 148. 1920.

2006. GATIN, V. C. Recherches anatomiques sur le pédoncule et la fleur des Liliacées. [Anatomical investigations of the peduncle and flower of the Liliaceae.] Rev. Gén. Bot. 32: 561-591. Fig. 56-60. 1920.—The final chapters of the investigations previously reported are here given. They comprise a study of the subfamilies Dracenoideae and Colchicoideae together with a summary of the relationships within the Liliaceae, and between this group and the neighboring families Juncaceae, Dioscoreaceae, Haemodoraceae, Amaryllidaceae, and Iridaceae as far as such relationships are shown by the anatomy of the peduncle and flower.—J. C. Gilman.

2007. GRAVIS, A. Connexions anatomiques de la tige et de la racine. [Anatomical connections between stem and root.] Bull. Acad. Roy. Belgique, Cl. Sci. 1919⁴: 227-236. 1919.—There is no true transition between these organs. The union of the conducting strands in the 2 regions is brought about (in young plants) by means of special cell groups (triads) composed of 1 group of centripetal vessels situated between the 2 halves of a fibro-vascular bundle consisting of centrifugal wood. At a level above this point, the 2 halves unite and the centripetal vessels disappear. At a lower level it is the centrifugal wood which disappears, and the bast bundles alternate with the centripetal wood strands. The author has studied various types of triads, and suggests solutions for the problems of the circulation of water in the young plant, the morphological value of the single cotyledon of monocotyledons and the evolutionary origin of these plants, the character of the so-called pseudo-monocotyledonous plants, the origin of the structure of stem and root from the point of view of phylogeny, and the significance of the triads.—Henri Michiels.

2008. HAAN, H. R. N. DE. Contribution to the knowledge of the morphological value and the phylogeny of the ovule and its integuments. Recueil Trav. Bot. Néerland. 17: 219-322. Fig. 1-12. 1920.—The structure of the ovule and in particular of its integuments is described in detail for the fossils *Lepidocarpon*, *Miadesmia membranacea*, *Lagenostoma Lomarii*, *Sphaerostoma ovale*, *Physostoma elegans*, *Trigonocarpus Parkinsoni*, *Mitrospermum compressum*, and *Bennettites*; and (in living plants) for 7 genera of cycads, for *Ginkgo*, for 8 genera of conifers, and for 3 of Gnetales. Ovular characters are critically compared throughout this wide range of plants in an attempt to determine the evolutionary history of the ovule and in particular of the integumentary structures. The author suggests that the most primitive type appears in *Physostoma*, where the units constituting the integument are most clearly evident. Progressing upward in the plant series these units become less and less clearly recognizable. The double integument, which makes its first appearance in the Gnetales and which occurs in the angiosperms, is discussed, and several suggestions to account for its origin are brought forward. The author concludes that the integuments of pteridosperms, gymnosperms, and (probably) angiosperms are homologous structures. The integument of these forms bears no relation to the indusium of ferns.—J. C. Th. Uphof.

2009. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. A rubber plant survey of northwestern North America. Univ. California Publ. Bot. 7: 159-278. Pl. 18-20. 8 fig. 1919.—See Bot. Absts. 8, Entries 2010, 2011, 2248.

2010. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. Chrysil, a new rubber from *Chrysothamnus nauseosus*. [Part II of: HALL, H. M., AND T. H. GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 183-264. Pl. 18-20, 6 fig. 1919.—The present paper undertakes to deal with "Chrysil," the rubber prepared

from any form of *Chrysothamnus nauseosus*: Its nature and properties; the distribution and habitats of the various forms of the plant producing it; the amounts of Chrysil available in western North America as estimated by districts; microscopical methods and chemical analysis as methods for detecting the presence of rubber and determining its amount; the results of the application of these methods in each variety of the species; distribution of rubber in the plant; factors influencing rubber content; methods of harvesting; possibilities of *C. nauseosus* as a cultivated plant and its cultural requirements. Primarily this is a study of the anatomy and histology of the varieties of the species mentioned in its various districts, with certain reference to the possibilities of Chrysil being utilized, especially in times of rubber scarcity.—W. A. Setchell.

2011. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. The occurrence of rubber in certain West American shrubs. [Part III of: HALL H. M., AND T. H. GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 265–278. 2 fig. 1919.—The present paper deals with the following: I, *Chrysothamnus* (exclusive of *C. nauseosus*) and *Haplopappus*; II, regional distribution of rubber in *Haplopappus*; III, species in which no rubber is found.—W. A. Setchell.

2012. HARRIS, J. ARTHUR, EDMUND W. SINNOTT, JOHN Y. PENNYPACKER, AND G. B. DURHAM. The vascular anatomy of dimerous and trimerous seedlings of *Phaseolus vulgaris*. Amer. Jour. Bot. 8: 63–102. 23 fig. 1921.—The gross vascular anatomy of normal (“dimerous”) bean seedlings and of abnormal “trimerous” forms (with 3 cotyledons and 3 primordial leaves) were studied descriptively and biometrically. In the typical condition of the normal seedling the root is tetrarch, there are 8 bundles in the hypocotyl, 2 strands depart for each cotyledon and the remaining bundles produce 12 strands in the epicotyl. In the typical trimerous seedling the root is hexarch, there are 12 bundles in the hypocotyl, 2 strands depart to each cotyledon and there are from 14 to 18 strands in the epicotyl. Additional, or “intercalary,” bundles appear in the hypocotyl of both types, but more often in normal seedlings. Bundle number in both types showed considerable variation, and the degree of variability differed with the seedling type and the region of the plant. Biometrical constants for the mean, standard deviation, and coefficient of variability for bundle number were determined for the various types of bundles and for the different regions of both seedling types. The variability in number of root poles is higher in trimerous than in dimerous seedlings. Intercalary bundles are highly variable in both types. In the hypocotyl, bundle number is far more variable in dimerous than in trimerous seedlings, but in the epicotyl just the reverse is true. Explanations of these differences are offered, based on a study of the general and comparative morphology of the plants in question. The authors emphasize “the importance of the use of both biometric and comparative methods to supplement each other in any attack upon the problems of general morphology or of morphogenesis.”—E. W. Sinnott.

2013. KONDO, M. Ueber die in der Landwirtschaft Japans gebrauchten Samen. [Seeds used in Japanese agriculture.] Ber. Ohara Inst. Landw. Forsch. 1: 399–450. 16 fig. 1919.—A continuation of descriptions already published (see Bot. Absts. 5, Entry 37) dealing with certain morphological characters of seeds and seedlings.—The present article describes seeds of the following plants: *Allium fistulosum*, *A. odorum*, *A. cepa*, *A. porrum*, *Daucus Carota*, *Cryptotaenia canadensis* var. *japonica*, *Apium graveolens*, *Petroselinum sativum*, *Arctium lappa*, *Lactuca sativa*, *Chrysanthemum coronarium*, *C. cinerariifolium*, and *C. roseum*.—H. S. Reed.

2014. MARLOTH, R. Notes on the function of the staminal and staminodal glands in the flowers of *Adenandra*. Ann. Bolus Herb. 3: 38–39. Pl. 1., fig. A. 1920.—The flower possesses 5 perfect stamens and, alternating with them, 5 sterile staminodes. Each of these organs bears a gland at its apex which secretes a viscid fluid. The secretion is a kind of balsam. The flowers are strongly protandrous. When the bud opens the staminodes connive toward the center of the flower, their glands being viscid; the stamens, on the other hand, stand erect outside the staminodes, the anthers being still closed and the apical glands erect and dry.

The viscid fluid can apparently serve only one purpose, to act as an adhesive by means of which the pollen is firmly attached to the mouth parts of the visiting insects as they force their heads in between the stamens and staminodes to reach the honey in the base of the flower. The complicated movements during anthesis are evidently the means of securing cross pollination.—*E. P. Phillips.*

2015. VUILLEMIN, PAUL. *L'inflorescence de Fuchsia coccinea*. [The inflorescence of *Fuchsia coccinea*.] *Compt. Rend. Acad. Sci. Paris* 171: 1194–1196. *Fig. 1–15*. 1920.—A teretological study of variations in symmetry, fusion of parts, and number of parts of the flowers of this species.—*C. H. Farr.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

2016. DIXON, ANNIE. *Exhibition of fresh-water Protozoa, June 5th*. *Ann. Rept. and Trans. Manchester Microsc. Soc.* 1919: 61, 62. 1920.—A list and discussion of forms exhibited at the June, 1919, meeting of the Manchester Microscopical Society. Among the forms noted are *Volvox globator*, *Pandorina morum*, *Phacus triqueter*, and 2 species of *Euglena*.—*C. E. Allen.*

2017. DIXON, ANNIE. *Protozoa. Report on gatherings from a pond at Lawnhurst, Didsbury, from 14th March to 12th Sept., 1918*. *Ann. Rept. and Trans. Manchester Microsc. Soc.* 1919: 74–81. 1920.—Flagellata and Dinoflagellata are included among the species listed.—*C. E. Allen.*

2018. DIXON, ANNIE, W. LEACH, H. BENDORF, AND J. G. KITCHEN. *Ramble to Pounds-wick and Northenden, May 24th, 1919*. *Ann. Rept. and Trans. Manchester Microsc. Soc.* 1919: 62, 63. 1920.—The list of species observed includes Myxophyceae, Chlorophyceae, Bacillarieae, Bryophyta, and (under Protozoa) several Flagellata and Dinoflagellata.—*C. E. Allen.*

2019. LEACH, W. *Ramble round Northenden, July 26th, 1919*. *Ann. Rept. and Trans. Manchester Microsc. Soc.* 1919: 63. 1920.—Several Flagellata and Dinoflagellata are included in the list of Protozoa observed.—*C. E. Allen.*

2020. LUCAS, R. *Protozoa*. *Arch. Naturgesch.* 80 B: 221–420. 1914 [1920].—A report of the literature which appeared during 1913 dealing with the Protozoa, including flagellates and dinoflagellates. A list of works arranged alphabetically under authors' names is followed by a résumé according to subject, and finally by a taxonomic summary.—*C. E. Allen.*

2021. MARUKAWA, H. *Plankton list and some new species of Copepoda from the northern waters of Japan*. *Bull. Inst. Oceanograph. Monaco* 384. 15 p., *pl. 1–4 and map*. 1921.—A list of 87 phytoplankton species collected in 1915–1916 in the Japan and Okhotsk seas and in the northern Pacific Ocean. The name, date, locality, and local distribution are given, in tabular form.—*T. C. Frye.*

2022. OKAMURA, KINTARO, KEISUKE ONDA, AND MICHITARO HIGASHI. *Preliminary notes on the development of the carpospores of Porphyra tenera Kjellm.* *Bot. Mag. Tôkyô* 34: 131–135. *Pl. 3*. 1920.—Carpospores were grown both in normal sea water and in the same diluted and enriched with calcium phosphate and NaNO_3 up to a specific gravity of 1.020. In both cases the carpospores put out rhizoidal outgrowths, shorter in the enriched solution, which produced frond-like growths, in no instance did the authors observe the development of gametes in the manner reported by YENDO (see *Bot. Absts.* 3, Entry 2464). They suggest possibility that the hypothetical gametes may have belonged to a Chytridinean fungus parasite.—*Leonas L. Burlingame.*

2023. SIMONS, HELLMUTH. Eine saprophytische Oscillarie im Darm des Meerschweinchens. [A saprophytic Oscillatoria in the intestine of the guinea pig.] Centralbl. Bakt. II. Abt. 50: 356-367. 1920.—The author, while searching for *Trichomonas* in the caecum of guinea pigs, accidentally discovered an alga which after careful study was found to be an *Oscillatoria*. Botanically the important point of interest is the nutrition of this alga which, living in total darkness, has become colorless and can no longer assimilate CO₂. It is probable that nutrition takes place purely through diffusion of organic materials in solution. The author, a zoologist, calls on the botanists for further investigations.—Anthony Berg.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1686, 1688, 1721, 1788, 2018, 2199, 2230, 2259)

2024. BRITTON, NATHANIEL LORD. *Flora of Bermuda* (illustrated). 8vo., 586 p., 1 pl., 519 fig. Charles Scribner's Sons: New York, 1918.—See Bot. Absts. 8, Entry 687.

2025. BRITTON, N. L., AND C. F. MILLSPAUGH. *The Bahama Flora*. Roy. 8 vo., viii + 695p. Published by the authors: New York, 1920.—See Bot. Absts. 7, Entry 1429.

2026. BURNHAM, STEWART H. *The mosses of the Lake George Flora*. Bryologist 23: 17-26. 1920.—See Bot. Absts. 8, Entry 118.

2027. CASARES-GIL, A. *Flora Iberica. Briófitas, primera parte. Hepáticas*. [Flora of Iberia. Bryophytes, first part. Hepaticae.] 8 vo., 775 p., 4 pl., 399 fig. Mus. Nacion. Cien. Nat. Madrid, 1919.—Aside from lists and short treatments in general descriptive works there has hitherto been no publication of much value to the student of the hepatics of Spain and Portugal. The present work fully supplies this need. The general introduction is followed by a detailed discussion of numerous morphological topics and by an account of the ecology and geographical distribution of the Hepaticae, in which emphasis is laid on their relation to substratum, humidity, latitude, and temperature. In the taxonomic portion of the volume, which occupies nearly 600 pages, 329 species are described and figured or at least critically discussed, many of these species being still unknown on the Iberian Peninsula. The book in fact is a manual of the hepatics of all southwestern Europe. In classification and nomenclature SCHIFFNER's treatment in the Engler and Prantl Pflanzenfamilien is usually followed, but the author has found it advisable to propose the following new specific combinations: *Calycularia Flotowiana* (Nees), *Haplozia Muelleriana* (Schiffn.), *Haplozia paroica* (Schiffn.), and *Haplozia subelliptica* (Lindb.).—O. E. Jennings.

2028. DIXON, H. N. *New and interesting South African mosses*. Trans. Roy. Soc. South Africa 8: 179-224. Pl. 11, 12. 1920.—A long series of South African mosses is enumerated, most of which were collected by H. A. WAGER, T. R. SIM, J. HENDERSON, D. B. HENDERSON, or M. HENDERSON. Each species is accompanied by full data regarding localities and, in many cases, by critical notes. In several instances the identity of South African species with those occurring in north temperate regions is established, and keys to the South African species are given under *Bryum* and *Lindbergia*. The following new species are described and figured, Dixon being the authority except where otherwise noted: *Brachythecium afro-albicans*, *B. pinnatum*, *Bryum pumili-roseum*, *Dicranella Symonsii*, *Didymodon afro-rubellus* Broth. & Wager, *D. Pottsii*, *Ditrichum spirale*, *Entodon cymbifolius* Wager & Dixon, *Erpodium distichum* Wager & Dixon, *E. transvaaliense* Broth. & Wager, *Fissidens papillifolius*, *Glyphomitrium marginatum* Wager & Dixon, *Gymnostomum Bewsii* Sim, *Isopterygium brachycarpum*, *Lindbergia viridis*, *Microthamnium ctenidioides*, *Plagiothecium Hendersonii*, *Psilopilum afro-laevigatum*, *Ps. Wageri* Broth., *Sciaromium capense*, *Tortula trachyneura*, and *Zygodon Simii*. The following new specific combinations are likewise made: *Anomobryum promontorii* (C. M.), *Brachymenium campylotrichum* (C. M.), and *Gymnostomum gracile* (Wager).—E. M. Doidge.

2029. DUTTON, D. LEWIS. *Buxbaumia indusiata* Brid., from Brandon, Vermont. *Bryologist* 24: 8. 1921.

2030. ELLEN, SISTER M. The germination of the spores of *Conocephalum conicum*. *Amer. Jour. Bot.* 7: 458-464. *Pl.* 34, 35. 1920.—In this species spores are well developed before September first (in Wisconsin) and during the fall cell divisions take place within them, 6 or 8 cells being produced within the spore wall. Winter is passed in this stage. In the spring, cell divisions proceed rapidly until each sporeling develops into a nearly spherical mass of from 30 to 40 cells, provided with chlorophyll and starch. The stalks of the carpocephala now lengthen rapidly; the setae elongate, thrusting the capsules through the calyptra; the capsule walls rupture, and the sporelings are dispersed. Sporelings collected in the fall and sown will develop. By bringing the plants or sporelings indoors and thus subjecting them to artificial conditions the normal developmental stages may be altered somewhat.—*E. W. Sinnott.*

2031. FAMILLER, I. Einige kritische Bemerkungen zu J. Röhl. Die Thüringer Torfmoose und Laubmoose und ihre geographische Verbreitung. [Critical remarks on J. Röhl's Thuringian mosses and their geographical distribution.] *Krypt. Forsch. Bayerische Bot. Ges.* 3: 187-188. 1918.—See *Bot. Absts.* 8, Entry 123.

2032. FLEISCHER, M. [Rev. of: AMANN, J., ET C. MEYLAN. *Flore des mousses de la Suisse*. (Moss flora of Switzerland.) Geneva, 1918 (see *Bot. Absts.* 4, Entry 1032).] *Hedwigia* 61: (Beiblatt) 34, 35. 1919.—The reviewer criticizes the non-use of Latin in describing new species and enumerates several generic names which he considers untenable. He likewise thinks that the authors should have adhered less to the old Schimperian classification and have made use of the more natural classification given in *Die Natürlichen Pflanzenfamilien* of Engler and Prantl.—*A. W. Evans.*

2033. FRYE, T. C. Notes on useful and harmful mosses. *Bryologist* 23: 71. 1920.—See *Bot. Absts.* 7, Entry 1513.

2034. GAGER, C. STUART. *Heredity and evolution in plants.* xv + 265 p., 112 fig. P. Blakiston's Son & Co.: Philadelphia, 1920.—See *Bot. Absts.* 7, Entry 1610.

2035. HOLZINGER, J. M. [Rev. of: DIXON, H. N. *New and interesting South African mosses.* *Trans. Roy. Soc. South Africa* 8: 179-224. *Pl.* 11, 12. 1920 (see *Bot. Absts.* 8, Entry 2028).] *Bryologist* 23: 91-92. 1920.—The reviewer commends the author's careful tracing of the identity of African species with those of temperate regions.—*E. B. Chamberlain.*

2036. JÄGGLI, MARIO. Contributo alla briologia ticinese. [Contribution to the bryology of Ticino.] *Boll. Soc. Ticinese Sci. Nat.* 1919: 27-44. 1919.—The author gives a list of 181 mosses from the canton of Ticino, Switzerland, based on collections which he made in 1902 and later. Full data regarding stations are given under each species, and critical notes are occasionally added. Of the species listed *Fissidens Curnovii* Mitt. and *Cylindrothecium cladorrhizans* (Hedw.) Schimp. are new to Switzerland, and 16 other species or varieties are new to Ticino.—*A. W. Evans.*

2037. JÄGGLI, MARIO. Una nota inedita di Alberto Franzoni sulle epatiche ticinesi. [An unpublished note by Alberto Franzoni on the hepaticae of Ticino.] *Boll. Soc. Ticinese Sci. Nat.* 1919: 19-26. 1919.—The author publishes a list of the Hepaticae known from the canton of Ticino, Switzerland. This list is based largely on a manuscript of FRANZONI bearing the date 1869, and for most of the records there are actual specimens in the Franzoni herbarium, now preserved in the museum at Locarno. The species enumerated number 64, of which 48 are Jungermanniales and 16 Marchantiales. From a historical standpoint the most interesting species listed is *Scapania Franzoniana* DeNot., here reduced to synonymy by MEYLAN and included under *S. subalpina* var. *purpurascens* Bryhn.—*A. W. Evans.*

2038. KAALAAS, B. Einige Bryophyten aus dem südlichsten Siberien und dem Urjankai-lande. [Bryophytes from the southernmost part of Siberia and the Urjankai country.] Skrifter K. Norske Videnskab. Selskab [Trondhjem] 1918: 1-13. Pl. 1, 2, 2 fig. 1919.—The collection studied by the author was made in 1914 by H. PRINTZ, botanist of the Norwegian Scientific Expedition to southern Siberia and the Urjankai country. It consists of fragmentary specimens growing in tufts of *Carex* or on the soil adherent to the roots of other vascular plants. The species listed include 8 hepatics, 7 peat mosses, and 57 true mosses. Two of the latter, *Brachythecium abakanense* and *Rhytidiadelphus Printzii*, are described as new and illustrated on the 2 plates, which were drawn by Printz.—A. W. Evans.

2039. KASHYAP, S. R. Distribution of liverworts in the western Himalayas. Jour. Indian Bot. 1: 149-157. 1920.—See Bot. Absts. 8, Entry 130.

2040. LORENZ, ANNIE. Some hepaticae from Matinicus Island, Maine. Bryologist 23: 1-3. 1920.—See Bot. Absts. 8, Entry 133.

2041. LOWE, RACHEL L. Rhacomitrium sudeticum, a moss new to Worcester County, Massachusetts. Bryologist 23: 4-5. 1920.—See Bot. Absts. 8, Entry 134.

2042. NEGRI, G. Su un musco cavernicolo crescente nell' oscurità assoluta. [A moss growing in absolute darkness.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29: 159-162. 1920.—See Bot. Absts. 7, Entry 2170.

2043. STANDLEY, PAUL C. Sphagnum in Glacier National Park, Montana. Bryologist 23: 5-6. 1920.—See Bot. Absts. 8, Entry 142.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 1827, 1837, 2194, and entries in the section Pathology)

FUNGI

2044. ANONYMOUS. [Rev. of: GUILLIERMOND, A. The yeasts. Translated and revised by F. W. TANNER. xix + 424 p., 163 fig. Chapman & Hall, Ltd.: London, 1920 (see Bot. Absts. 8, Entry 2057).] Sci. Prog. [London] 15: 500. 1921.

2045. ARTHUR, JOSEPH CHARLES. Aecidiaceae (Uredinales). North Amer. Flora 7: 269-336. Dec. 24, 1920; 7: 337-404. Dec. 31, 1920; 7: 405-480. Feb. 8, 1921.—In continuation of his taxonomic treatment of the North American rusts the author in Part 4 presents a key to the 269 recognized American species of *Dicacoma* and gives a complete treatment of 88 species. For each of these is given complete synonymy, descriptions of the several stages and the known host plants on which each occurs. Exsiccatae are cited, and the distribution and the type locality for each species is given together with the published illustrations. For those species that occur on Poaceae FRED DENTON FROMME is named as collaborator. A total of 44 new species or new combinations is given. The latter in most cases represent transfers from *Puccinia*, *Aecidium*, *Uredo*, and *Roestelia*. Two transfers are made from *Diorchidium* and one from *Uromyces*.—In Part 5 the treatment of *Dicacoma* is continued with the presentation of descriptions of 112 species. For species on *Carex* the author has collaborated with FRANK DUNN KERN. A total of 63 new species or new combinations is given, the latter representing transfers chiefly from *Puccinia*, *Aecidium*, *Uredo*, and *Caecoma*. One transfer is made from *Rostrupia*.—In Part 6 *Dicacoma* is completed and HERBERT SPENCER JACKSON is named as collaborator for the species which occur on *Carduaceae*. In this part is given a similar treatment of the genus *Pucciniola* with 25 species and *Allodus*

with 49 species. In the latter genus CLAYTON ROBERTS ORTON is named as collaborator for all the species. The genus *Klebahnia* having 8 species is begun but only 6 of them are completely treated. Of new species and new combinations there are in this part 51 for *Dicaeoma*, 25 for *Pucciniola*, 10 for *Allodus*, and 5 for *Klebahnia*. The new combinations in *Dicaeoma* represent transfers from *Puccinia*, *Uredo*, and *Aecidium*, those in *Pucciniola* transfers from *Aecidium*, *Uromyces* and *Puccinia*, those in *Allodus* transfers from *Puccinia* and *Aecidium*, and those in *Klebahnia* transfers from *Uromyces*.—The material here presented is the first thorough taxonomic work on these groups in North America and it should be examined by every student interested in the rusts.—E. B. Payson.

2046. ARTHUR, JOSEPH CHARLES. New species of Uredineae-XIII. Bull. Torrey Bot. Club 48: 31-42. 1921.—*Puccinia pacifica* Blasdale, *P. irrequisita* Jackson, *Uromyces coordinatus*, *Ravenelia havanensis*, and *Lipospora tucsonensis* are described as new species. *Puccinia additica* Jackson & Holway nom. nov. for *P. Coreopsidis* Jackson & Holway, *P. opposita* (Orton) comb. nov., *P. Erigeniae* (Orton) comb. nov., *Polythelis suffusca* (Holway) comb. nov., and *Gallowaya pinicola* nom. nov. for *G. Pini* Arth. are given and the following new genera are made: *Lipospora* and *Teleutospora* Arthur & Bisby, the latter being for 3 species of *Uromyces* (*U. Rudbeckiae* Orth. & Holw., *U. Solidaginis* Niessel, and *U. bahiniicola* Arth.). *Micropuccinia* Rostrup is discussed and to it are referred a number of species included by Rostrup in 1902 as well as those short-cycle forms placed by him in *Dasyospora*. Ninety species are here referred to *Micropuccinia*, and are to be credited to Arthur and Jackson.—P. A. Munz.

2047. BACHMANN, E. Der Thallus saxikoler Pilze: *Phaeospora propria* (Arn.) und *Nectria indigens* (Arn.). [The thallus of the saxicolous fungi *Phaeospora propria* (Arn.) and *Nectria indigens* (Arn.).] Centralbl. Bakt. II Abt. 50: 45-54. Fig. 1-11. 1920.—By the term saxicolous fungi, the author designates fungi which grow and fruit on rock apparently free from organic matter. The author has previously shown in the case of *Pharcidium lichenum* (Arn.) and *Didymolla Lettaniana* Keiszl. that such fungi exist. The present investigations show that *Phaeospora propria* (Arn.) is an endolithic lime fungus with a parasymbiotic mode of life. It probably lives with vigorously developed and fruiting lichen beds as a parasymbiont. Most significant, however, is the fact that the fungus has the power of penetrating deeply into the lime not only by means of the lichen hyphae but also by means of true fungus hyphae. If the dissolving of the lime is accomplished by means of CO₂ produced in the respiration of the fungus, it would appear that there are 2 types of saxicolous fungi, one with an accentuated respiration (endolithic) and the other with normal respiration (exolithic). *Nectria indigens* is an exolithic lime fungus which grows parasymbiotically with several lichen complexes but in no way forms a truly combined lichen thallus. In its latest stages, however, the fungus lives as a true parasite upon the engulfed lichen complex. The lichen seems to be the only visible source of carbon for this saxicolous fungus.—Anthony Berg.

2048. BAMBEKE, CHAS. VAN. Recherches sur certains elements du mycélium d'*Ithyphallus impudicus* (L.). [Certain elements of the mycelium of *I. impudicus*.] Bull. Acad. Roy. Belgique Cl. Sci. 1914: 280-286. 2 pl. 1914 [1919].—The author concerns himself here with structures which from their shape and certain peculiarities he calls "glomézules mycéliens." They occur in the cortex of the rhizomorphs. After describing their form and structure the author states that they do not constitute organs of propagation comparable to the bulbils and tubercles of the phanerogams.—Henri Micheels.

2049. BOEDYN, K., UND C. VAN OVEREEM. Mycologische Mitteilungen. Serie I. Ascomyceten. Erstes Stück. Über das Vorkommen von Carotinkristallen in zwei neuen *Peziza*arten. [Mycological notes. Series I. Ascomycetes. First part. On the occurrence of carotin crystals in two new species of *Peziza*.] Hedwigia 59 307-312. Pl. 2. 1918.—Two species of the *Pezizales* are described as new, *Humaria carota* and *Ascophanus fimicola*. Carotin in the form of prominent crystals was found in the ends of the paraphyses and in the cells of the hypothecium.—H. M. Fitzpatrick.

2050. BOSE, S. R. Descriptions of fungi in Bengal, Series II, in continuation of Proc. Indian Assoc. Cultivation Sci. Vol. IV Part IV (Agaricaceae and Polyporaceae). Proc. Sci. Convention Indian Assoc. Cultivation Sci. 1918: 136-143. Pl. 1-13. 1920.—The following species collected in Calcutta and its suburbs are described and figured (the figures show the fruiting body above, below, and in section): *Lepiota mastoidens*, *Coprinus niveus*, *Volvaria tirastins*, *Lenzites betulina*, *Polyporus gilvus*, *P. sp.*, *Polystictus versicolor*, *P. leoninus*, *P. tabaeinus*, *Fomes annularis*, *F. (Ganoderma) lucidus*, *Trametes cingulatus*, *Daedalea Hobsoni*. Most of the polypores reported were found on dead wood. The paper constitutes part II of Bengal Polyporaceae, which is being published serially.—S. R. Bose.

2051. COSTANTIN, JULIEN, ET LEÓN DUFOUT. Sur la biologie du *Goodyera repens*. [Concerning the biology of *Goodyera repens*.] Rev. Gén. Bot. 32: 529-533. 1920.—A fungus isolated in a large proportion of the trials is regarded as a symbiont and is named *Rhizoctonia Goodyera repentis*.—J. C. Gilman.

2052. DIETEL, P. Über die Aecidiumform von *Uromyces Genistae tinctoriae*. [Concerning the aecial state of *Uromyces Genistae tinctoriae*.] Ann. Mycol. 17: 108-109. 1919 [1920].—Observations made by the author on a field association of an Aecidium on *Euphorbia cyparissias* with *Uromyces Genistae tinctoriae* (Pers.) Wint. on *Genista tinctoria* are recorded. These observations strongly indicated a genetic connection between the two forms and an isolated field culture was accordingly made which resulted in the development of uredinia on *Genista tinctoria* following exposure to infection by aeciospores from *Euphorbia cyparissias*. The aecial state belongs to the collective species *Aecidium Euphorbiae* Gmel. which causes deformation of the host. Considerable variation exists in the character of the deformation in this species and the author describes this in some detail in comparison with a description of the case observed. There appears to be no correlation between the type of deformation in the aecial host and the different species of *Uromyces* with which this aecidium has been previously connected.—H. S. Jackson.

2053. DOIDGE, ETHEL M. South African Microthyriaceae. Trans. Roy. Soc. South Africa 8: 235-282. Pl. 13-19. 1920.—This is a systematic account of the South African Microthyriaceae as represented in the Union National Herbarium. Fifty species are included belonging to the following genera: *Microthyrium* (1), *Segnesia* (1), *Morenoina* (1), *Englerulaster* (3), *Parasterina* (3), *Asterina* (30), *Asterinella* (4), *Lembosia* (3), *Echidnodes* (1), *Morenoella* (1), *Echidnodella* (1), *Amazonia* (1). Theissen records only 6 species of *Asterina* from Africa. The following new species are described: *A. clausenicola*, *A. delicata*, *A. Excoecariae*, *A. ferruginosa*, *A. Hendersoni*, *A. natalensis*, *A. Peglerae*, *A. polythyria*, *A. raripoda*, *A. reticulata*, *A. rhamnicola*, *A. robusta*, *A. Trichiliae*, *A. uncinata*, *A. undulata*, *Parasterina implicata*, *P. rigida*, *Asterinella Acokantherae*, *A. Burchelliae*, *A. lembosoides*, *A. Woodiana*, *Englerulaster Popowiae*, *Lembosia natalensis*, *L. radiata*, *Echidnodes rhoina*, *Microthyrium maculicolum*, *Echidnodella Hypolepides*, *Morenoella Oxyanthae*, *Morenoina africana*. A host index is appended.—E. M. Doidge.

2054. ERIKSSON, JAKOB. Die Hauptergebnisse einer Untersuchung über den Wirtswechsel und die Spezialisierung von *Puccinia Caricis* Reb. [Principal results of investigations regarding the alternation of hosts and the specialization of *Puccinia Caricis* Reb.] Centralbl. Bakt. II Abt. 50: 441-443. 1920.—A preliminary report of culture studies with *Puccinia Caricis* giving an analytical grouping of the results based on the experiments of the author and those of H. KLEBAHN. Numerous observations point to the conclusion that there are biological forms in all groups studied.—Anthony Berg.

2055. FOËX, E. Sur l'histoire du développement du *Peronospora spinaciae* (Grew.) Laub. [Rev. of: ERIKSSON, J. On the development of *Peronospora spinaciae* (Grew.) Laub. Ark. Bot. 15¹³: 1-25. Pl. 4, 3 fig. 1918 (see Bot. Absts. 3, Entry 356).] Rev. Gén. Bot. 32: 552-560. Pl. 14, 15. 1920.—A technical review of Eriksson's work describing the life-cycle of the fungus, including mycoplasma phase, oospores, and oospore germination.—J. C. Gilman.

2056. FRIEDERICH, K. Über die Pleophagie des Insektenpilzes *Metarrhizium anisopliae* (Metsch.) Sor. [On the parasitism of the insectivorous fungus *Metarrhizium anisopliae* (Metsch.) Sor.] *Centralbl. Bakt.* II Abt. 50: 335-356. Pl. 1 (colored). 1920.—The fungus growth is pictured in colors. The results of a number of experiments in which various hosts were used are recorded. An extensive bibliography is appended.—H. M. Fitzpatrick.

2057. GUILLIERMOND, ALEXANDRE. **The yeasts.** Translated and revised in collaboration with the original author by F. W. TANNER. xix + 424 p., 163 fig. John Wiley and Sons, Inc.: New York; Chapman and Hall, Ltd.: London, 1920.—This English edition is based on Guilliermond's "Les Levures," published in 1912 as a volume of the *Encyclopédie Scientifique*. It is not merely a translation, but constitutes a revision in the light of recent literature. The yeasts are treated from the standpoints of morphology, cytology, physiology, phylogeny, and taxonomy. Methods for use in the characterization and identification of species are given, as well as methods of culture and isolation. In the taxonomic treatment the group is subdivided into *Saccharomycetes* and *Non-Saccharomycetes*, the latter group embracing such genera as *Torula*, *Pseudosaccharomyces*, *Cryptococcus*, and *Mycoderma*. Fungi related to the yeasts are also discussed, e. g., *Endomyces albicans*, *Monilia candida*, *Pseudomeliola albomarginata*, and *Parentomyces pulmonalis*. Many of the forms are figured. An extensive bibliography is appended. A large number of pathogenic yeasts are described. An attempt has been made to present in a single book the essential information available concerning the whole group of yeasts and yeast-like organisms having in mind every point of view. Although several treatises have previously appeared dealing with yeasts in relation to fermentation this is the first book to cover the broader field, and it fills a need long felt for a comprehensive reference work on this subject.—H. M. Fitzpatrick.

2058. HENRICI, A. T., AND E. L. GARDNER. **The acid fast actinomycetes with a report of a case from which a new species was isolated.** *Jour. Infect. Diseases* 28: 232-248. 1921.—A new species of *Actinomyces*, *A. gypsoides*, which is acid fast and pathogenic is described. It is characterized by strong proteolytic activities, the darkening of media containing peptone, and the possession of chalky-white aerial mycelium.—Selman A. Waksman.

2059. HERRMANN, EMIL. **Bestimmungstabelle zu den Täublingen.** [Key to the Russulas.] *Hedwigia* 60: 331-341. 1919.—A key to the species of the genus *Russula* based primarily on color and taste. Almost 100 species are included.—H. M. Fitzpatrick.

2060. HIGGINS, B. B. **Morphology and life history of some ascomycetes with special reference to the presence and function of spermatia.** *Amer. Jour. Bot.* 7: 435-444. 2 fig., 1 pl. 1920.—Spermatia or similar structures have been observed in various families of ascomycetes. As an example of a species which produces spermatia, the author outlines the life history of *Mycosphaerella Bolleana* n. sp., an ascomycete parasitic on the leaves of the fig. He presents a diagnosis of the species and describes in detail the production of conidia, spermatia, and asci. All attempts to germinate the spermatia failed. Artificial infections with ascospores produced conidia on the leaves of the fig.—E. W. Sinnott.

2061. HÖHNEL, FRANZ VON. **Mycologische Fragmente.** [Mycological fragments.] *Ann. Mycol.* 17: 114-133. 1919 [1920].—*Tricholoma tenuiceps* Cooke & Massee is transferred to *Russula*. *Mycopron Pandani*, on dry leaves of *Pandanus* sp., and *Phragmothyrus fimbriatum*, on leaves of *Ardisia fuliginosa*, are described as new; the latter is compared with *P. corruscans* (Rehm) Th. *Meliola rubicola* P. Henn. is considered identical with *Sphaeria calostroma* Desm. The structure of the perithecial wall and appendages is described and the relationship of this genus, as illustrated by this species, with other groups is discussed. *Asterella olivacea* v. H. is transferred to *Microthyriella* v. H. and the relationship of the latter genus with *Schizothyrium* discussed. *Pseudonectria Metzgeriae* Ade. & v. H., found on upper surface of thallus of *Metzgeria furcata*, is described as new. *Sphaeria bryophila* Roberge is thought to be identical with *S. muscivora* Berk. & Br. and the new combination *Nectria muscivora* (Berk.

& Br.) v. H. is proposed; a full description is furnished. The author concludes from an examination of original material that *N. Hippocastani* Otth. (*Calonectria Hippocastani* (Otth.) Sacc.) is based on a mixture of *Nitschkia cupularis* (Pers.) Kant. and *Melanomma Pulvis pyrius* (Pers.) Fekl. After a study of original material the author also concludes that *Miyakeamyces Bambusae* Hara, originally described as a new genus and species, is not parasitic on *Phyllachora Phyllostachydis* Hara, but is parasitic directly on the leaves of *Phyllostachys bambusoides*; it is here considered one of the Nectriaceae and transferred to the genus *Calonectria*. A full redescription is given. *Broomella Lagerheimia* Patouill. is considered a related species and is also transferred to *Calonectria*. For the benefit of those who accept the genus *Puttemansia* P. Henn. as distinct from *Calonectria*, new combinations of these 2 species are also provided in that genus. *Neopeckia episphearia* occurring on old stromata of *Hypoxyylon rubiginosum* is described as new. A new genus of the Melanommeae, *Melanopsammella*, based on *Eriosphaeria inaequalis* Grove, is proposed with *Gonythyricum* as the conidial stage. *Sphaeria helicicola* Desm. is redescribed from original material and transferred to *Lophiotrema*. The opinion is expressed that *Sphaeria Hederae* Sow. is probably identical with *S. helicicola*. *Othia Winteri* Rehm is thought to be only a poorly developed form of *Cucurbitaria protracta* Fekl. *Othia Rubi* occurring on canes of *Rubus Idaeus* and *R. caesius* is described as a new species based on specimens distributed in Roumeguere's Fungi Gall. Exc. Nos. 1585 and 1596 as *Melanopsamma mendax* S. & R. and *M. ruborum* (Lib.) respectively. *Uleomyces cinnabarinus*, parasitic on the stroma of *Venturia aggregata* Wint., is described as a new species. The latter is redescribed and transferred to *Antennularia* (*Caleroa*). The opinion is expressed that *Antennularia*, *Montagnina*, and *Parodiella* are related genera and best placed in the Cucurbitariaceae. *Botryostroma inaequale* (W.) v. H. is considered to be dothidiaceous and related to *Munkiodothis*. A description of *Didymella superflua* (Awld.) Sacc. drawn from authentic material is given, together with a historical review of the species and a discussion of its relationships and associated forms; a considerable number of specimens, including many issued in various exsiccati, were examined and a detailed discussion of these is included. *Epicoccum nigro-cinnabarinum* is described as new, based on Sydow's Mycoth. March No. 2548. The new combination *Didymella Sisymbrii* (Rehm) v. H., based on *D. superflua* var. *Sisymbrii* Rehm, is proposed and a description furnished drawn from specimens issued in Krieger F. Saxon. No. 2314 and Rehm Ascom. Exs. No. 2170. Attention is called to the necessity for a critical study of all species of the genus *Didymella* and the opinion expressed that many of the species now assigned to it belong in other genera including *Carlia*, *Didymellina*, *Metasphaeria*, *Didymosphaeria*, *Diaporthe*, etc. The taxonomic history of *Sphaeria cooperta* Desm. is reviewed and the conclusion reached that this species is properly referred to *Anistomula* v. H.; the new combination, *A. cooperta* (Desm.) v. H., is proposed. The fungus occurs on the under side of leaves of *Quercus coccifera*. A full description is given and its relationship with *Anistomula Quercus Ilidis* (Trav.) v. H. is discussed. *Leptosphaeria typharum* (Desm.) Karst. and *L. culmorum* Awld. are thought to be substratum forms of the same species. In this connection the relationship of *Leptosphaeria* de Not, *Scleroplella* v. H., and *Nodulisphaeria* Rbh. is discussed. The author does not agree with HASZLINSKY in considering *Gibbera vitis* Schulzer and *Valsa ampelina* (Fuck.) Nitschke identical with *Echusias vitis* Hasz. The latter genus is thought to be identical with *Frachiaea* Sacc.; both genera were established in 1873. The latter name is preferred by the author and the new combination *F. vitis* (Hasz.) v. H. is proposed. Attention is called to certain errors occurring in the author's classification of the Diaporthaceae (Ber. Deutsch Bot. Ges. 25: 1917) and to certain additions to the same. These corrections and additions relate to the genera *Ophiognomonina*, *Valseutypella* v. H., *Neozimmermannia* Koorders, *Disperma* Thies., *Cryptonectriopsis* v. H., and *Plagiostomella* v. H. *Sphaeria cryptosphaeria* Fuckel is thought to be identical with *Ditopella fusispora* de Not. *Rehmiella* Winter is considered identical with *Ditopella* de Not, and *Rehmiella alpina* Winter is transferred to the latter genus. *Sphaeria protuberans* Fuckel as represented by the specimen distributed in F. Rhen. No. 2242 is also considered identical with *Ditopella fusispora*. Additional evidence is presented to support the opinion previously published by the author that *Diaporthe Krie-*

geriana Rehm is merely a *Euporthe* form of *Diaporthe coneglanensis* Sacc. & Speg. The occurrence of *D. marginalis* Peck in Europe on branches of the green alder is recorded and a description furnished. *D. cerasina* Rehm is considered to be only a form of *Valsa* (*Leucostoma*) *cincta* Fr., and the new combination and variety *Leucostoma cincta* (Fr.) v. H. var. *cerasina* (Rehm) v. H. is proposed; *Valsa sphaerostoma* Nitschke is thought to be the same.—H. S. Jackson.

2062. KEISSLER, KARL VON. Revision der von Sauter aufgestellten Pilze (an Handen dessen Herbars). [Revision of the fungi published by Sauter (on the basis of specimens in his herbarium).] *Hedwigia* 60: 352–361. 1919.—Sauter described between 1800 and 1881 a large number of fungi, chiefly discomycetes, and since his descriptions of these are very short and often inadequate, a knowledge of the type specimens in his herbarium has been desirable. Keissler has studied these and records his observations here. Of 143 species described by Sauter, he finds practically none to be valid.—H. M. Fitzpatrick.

2063. KILLERMANN, S. Neuer Fund von *Sarcosoma globosum* (Schmidel) Rehm bei Regensburg. [New discovery of *Sarcosoma globosum* near Regensburg.] *Hedwigia* 59: 313–318. Pl. 3, 2 fig. 1918.—The rediscovery of this rare fungus is announced, and the belief is expressed that it constitutes a valid genus and species.—H. M. Fitzpatrick.

2064. KILLIAN, CHARLES. Le développement du *Dothidella Ulmi* (Duv.) Winter. [The development of *Dothidella Ulmi* (Duv.) Winter.] *Rev. Gén. Bot.* 32: 534–551. Pl. 16–19. 1920.—The development of this organism causing a leaf-spot of the elm was studied morphologically and histologically. The paper is divided into 2 parts. The 1st part contains a detailed description of the development of conidia and ascospores. The 2nd part is a discussion and comparison of the morphology of *Dothidella* and other ascomycetes and the Uredinales. The author concludes that the ascomycetes and the Uredinales had a common ancestry.—J. C. Gilman.

2065. LUYK, A. VAN. Uber *Gloeosporium Tremulae* (Lib.) Pass. und *Gloeosporium Populi-albae* Desm. [Concerning *Gloeosporium Tremulae* and *G. Populi-albae*.] *Ann. Mycol.* 17: 110–113. Fig. 1. 1919 [1920].—These species of *Gloeosporium* are considered identical with *G. circinans* (Fckl.) Sacc. and agree with it in having the spores, in part, united laterally by short connecting processes into complex groups of various shapes. Based upon this character, *Titaeosporina* is proposed as a new genus of the Melanconiaceae-Hyalosporae with *T. Tremulae* (Lib.) van Luyk as the type species. A full synonymy and description is furnished. The hosts are *Populus alba*, *P. tremula*, and *P. canescens*. The genus is thought to be analogous to *Titaeospora* Bubak but differs from the latter in the absence of septation in the spores.—H. S. Jackson.

2066. ORTON, W. A. Compilation of list of new fungi. *Phytopathology* 11: 29–30. 1921.—“The British Mycological Society intends to publish the original diagnoses of the genera of fungi which have appeared since the last volume (22) of Saccardo's *Sylloge*, and to keep the list up to date by annual installments. Doctor J. Ramsbottom, general secretary of the Society, British Museum (Natural History), Cromwell Road, London, S. W. 7, has undertaken to compile this list, and would welcome separates in which new genera have been described, or assistance in any way. It is believed that the list will be valuable to all interested in mycological studies.”—H. M. Fitzpatrick.

2067. OUDEMANS, C. A. J. A. *Enumeratio Systematica Fungorum*. [A systematic enumeration of fungi.] Vol. 1. cxxvi + 1230 p. Martinus Nijhoff: The Hague, 1919.—This is the 1st volume of a 5 volume set. The 4 additional volumes will appear at irregular intervals. The work constitutes a host index enumerating all fungi living as parasites on the plants of Europe. Citations to mycological literature have been added to the names of the fungi listed, thus making possible the location of the original references to the parasitism of each

fungus mentioned. The host plants are arranged according to the Engler system. Volume 1 includes all hosts belonging to the lower groups of plants up to and including the Monocotyledons, volumes 2, 3, and 4 will embrace the dicotyledons, and volume 5 will serve as an alphabetical register for the 4 preceding volumes. The fungi are arranged by families under the name of the host, the families of each of the primary subdivisions of the fungi being grouped together. The organs of the host on which the fungus occurs are also indicated. Only the flora of Europe is covered but the term "European plant" is used in its broadest sense, any plant found in the living state in Europe, whether wild or cultivated, native or introduced, being included. Although the author died in 1906 the work has been completed up to 1910 by collaborators, and the whole is published under the direction of the *Hollandse Maatschappij van Wetenschappen* of Haarlem. The work represents an attempt to meet a need long-felt by mycologists for a host-index, a need hitherto very imperfectly supplied by volume 13 and succeeding volumes of Saccardo's *Sylloge Fungorum*.—*H. M. Fitzpatrick.*

2068. OUDEMANS, C. A. J. A. *Enumeratio Systematica Fungorum*. [A systematic enumeration of fungi.] Vol. 2. *xix + 1069 p.* Martinus Nijhoff: The Hague, 1920.—The 2nd volume of the publication discussed in the preceding entry. This volume contains hosts belonging to the 17 families of the dicotyledons—Salicaceae to Basellaceae inclusive.—*H. M. Fitzpatrick.*

2069. PETRAK, F. *Mycologische Notizen*. [Mycological notes.] *Ann. Mycol.* 17: 59–100. 1919 [1920].—*Phomopsis pustulata* Sacc. is transferred to *Sclerophoma*; a detailed description is given, also a comparison with *Sclerotiopsis protracta* (Sacc.) Died. and *Myxofusicoccum obtusulum* (Sacc. & Br.) Died. A *Cytospora* stage of *Valsella polyspora* Nke. is described which is considered identical with *Cytospora personata* Fr. Evidence is presented to show that *Valsella polyspora* and *V. adhaerens* Fekl. are probably merely many-spored forms of *Valsa Auerswaldii* Nke. *Dothidella ribesia* (Pers.) Theiss. and Syd. is transferred to *Phragmodothella* and a full synonymy given, with which the American species *P. Kelseyi* (Ellis & Ev.) Theiss. & Syd. (*Homostegia Kelseyi* Ellis & Ev.) is questionably included. *Phomopsis juglandina* (Fekl.) v. H. is described in full together with a *Fusicoccum*-like form which is considered an abnormal type of the *Phomopsis*. *Septoria Meliloti* (Lasch.) Sacc. (*Sphaeria Meliloti* Lasch.), *Ascochyta caulicola* Laubert, *Stagonospora carpathica* Bäum., and *S. Medicaginis* (Desm. & Rob.) v. H. are all considered to be identical with *S. compta* (Sacc.) Died., and the new combination *S. Meliloti* (Lasch.) Petrak is proposed and full synonymy given. A detailed description is given of a form of *Phomopsis ribesia* (Sacc.) Died. which is stated to be the spermagonial form of *Diaporthe purgens* Nke. The latter is considered merely a form of *D. strumella* (Fr.) Fekl. An *Othia* on *Ligustrum* is described which is considered identical with *Othia Crataegi* Fekl.; *Diplodia ligustrina* West was collected in association with it but it is not thought to be the conidial stage since 2 species of *Didymosphaeria* were also found either of which might be the ascogenous stage of the *Diplodia*. *Phleospora Hrubyana* Sacc. on *Spiraea chamaedrifolia* is described and considered identical with *Septoria magnusiana* Allesch. In this connection the relationship and limitations of the genera *Phleospora*, *Septoria*, *Cylindrosporium*, and *Septogloeum* are discussed and the following new combinations proposed: *Phleospora platanoides* (Allesch.) Petrak (*Septoria seminalis* Sacc. var. *platanoides* Allesch.), *P. heraclei* (Lib.) Petrak (*Ascochyta heraclei* Lib.), *P. padi* (Karst.) Petrak (*Cylindrosporium padi* Karst.), *P. magnusiana* (Allesch.) Petrak (*Septoria magnusiana* Allesch.). The conclusion is reached that *Diaporthe spiculosa* (Alb. & Schw.) Nke. and *D. circumscripta* Oth. occurring on *Sambucus* spp. are identical, being merely growth forms of the same species. Likewise the 2 conidial forms assigned to these species, *Phoma sambucella* and *P. sambucina*, are the same and should be cited as *Phomopsis sambucina* (Sacc.) Trev. A new genus, *Keisslerina*, regarded as closely related to *Dothiora*, is founded on a hitherto undescribed species, *K. moravica*, occurring on dry twigs of *Evonymus europaea*; *Dothichiza evonymi* Bub. & Kab. is the conidial stage. An immature ascomycete, presumably a species of *Botryosphaeria*, is described which is considered to be the probable ascogenous stage of *Botryodiplodia Fraxini* (Lib.) Sacc., with which it was associated and of which a full description is given. *Dothiorella Fraxini* (Lib.) Sacc. is thought to be merely a young development of the same species; likewise

a fungus identified as *Fusicoccum Forsythiae* Died., occurring on branches of *Forsythia*, *Syringa*, *Ligustrum*, and *Cornus* is considered identical. A full synonymy is given but no name is applied to the ascomycete form on account of its immaturity. *Stigmatia moravica* Petrak is redescribed in detail from a recent collection of material showing unusually rich development. It is shown that the fungus belongs in the Hypocreaceae, and *Nectriella moravica* Petrak is proposed as a substitute name. A new genus, *Cytoplacosphaeria*, founded on *Placosphaeria rimosa* Out., is proposed which differs from other genera of the Sphaeriaceae in the relation of the pycnidia to the stroma. The author disagrees with von Höhnelt in considering this species the conidial stage of *Scirrhus rimosa* (Alb. & Schw.) Fekl.; it is suggested that *Diplodina arundinacea* Sacc. may possibly be identical. *Cytosporina Rubi* Died. is considered identical with *Rhabdospora ramedalis* Desm. & Rob. and the new combination *Cytosporina ramedalis* (Desm. & Rob.) Petrak is proposed. A detailed description is given of a *Phomopsis* which is considered to be the conidial form of *Diaporthe Winteri* Kunze and the new combination *Phomopsis Winteri* (Kunze) Petrak is proposed. *P. crataegicola* n. sp. occurring on dry twigs of *Crataegus oxyacantha* is described and thought to be a conidial stage of *Diaporthe Crataegi* Fekl. The author distinguishes the latter from *D. semiimmersa* Nke. A detailed description is given of *Phoma chamaeropsis* Cooke occurring on *Chamaerops humilis* and the new combination *Phomopsis chamaeropsis* (Cooke) Petrak is proposed. The suggestion is made that *Phyllosticta magnusii* (Bomm. & Rouss.) Allesch. and *P. cocoinea* (Cooke) Allesch. var. *Phoenicis* (Brun.) Allesch. are substratum forms of the same species. *Pseudopleospora* is proposed as a new genus of ascomycetes, with *P. ruthenica* n. sp., on decorated stems of *Eupatorium cannabinum*, as the type species; its relationships are uncertain, it possibly belonging near the Hypodermataceae. The author suggests that it may represent a distinct family. *Peltosphaeria Petrakiana* Rehm is redescribed and transferred to *Dothiora*; *Dothichiza fallox* Sacc. is thought to be the conidial stage. *Fusicoccum hranicense*, on dry twigs of *Ulmus campestris*, formerly confused with *Phomopsis oblonga*, is described as a new species. *Neokeissleria* is proposed as a new genus, based on *Ceriospora ribis* P. Henn. & Floettner; a description with full synonymy is given. The relationship of this new genus with *Ceriospora* and *Melanconis* is discussed in detail. *Phomopsis phyllophila*, on dry overwintered leaves of *Trifolium repens*, is described as new. *Phomopsis pyrrhocystis*, on dry twigs of *Corylus avellana*, is also described as new and is thought to be the spermatogonial form of *Diaporthe pyrrhocystis* (Berk. & Br.) Fekl., with which it was found associated. *Karstenula ligustrina* n. sp., on dry sprigs of *Ligustrum vulgare*, is described and thought to be the ascogenous stage of *Microdiplodia mamma* Allesch. *Cucurbitaria moravica* Rehm is transferred to *Karstenula*; *Microdiplodia Pruni* Died. was found in association with it. *Chaetocytostroma*, showing relationship with *Fusicoccum*, is proposed as a new genus based on an hitherto undescribed species, *C. arundinacea*. The genus differs from *Fusicoccum* in the small spores and a hairy stroma. A new genus of the Nectroidaceae, *Blennoriopsis*, is described, based on *B. moravica* n. sp., on stems of *Linaria genistifolia*. *Diaporthe abnormis* v. H. is considered identical with *D. occulta* (Fekl.) Nke. (*Calospora occulta* Fekl.). The latter is made the basis of a proposed new genus, *Macrodiaporthe*, which is stated to differ from *Diaporthe* in that the stroma develops only above with the perithecia free below, the walls of the latter being thick and leathery and the spores and asci very large. A full synonymy is given. The author agrees with von Höhnelt in considering *Diaporthe oncostoma* and *D. fasciculata* on *Robinia* identical, and accepts his view that *D. leiphaemia* and *D. dryophila* on *Quercus* are the same; also that *D. Radula* and *D. oligocarpa* are identical. But he does not agree that *D. Crataegi* and *D. semiimmersa* are one species. *D. brachyceras* on *Ligustrum*, *D. crassicollis* on *Cornus*, *D. similans* on *Rosa* agree with forms on Pomaceae and *Prunus* investigated by von Höhnelt. The author does not agree with von Höhnelt in separating the genus into *Euporthe*, *Tetrastaga*, and *Chlorostate*, and thinks that this treatment only serves to complicate the situation. Some general discussion of the genus is given and the importance of more culture work is emphasized. *Diaporthe Delogneana* Sacc. & Roum. and *D. heliciis* Niessl. are considered identical and a detailed description is given. A new genus, *Phaeodiaporthe*, based on *P. Keissleri* n. sp. occurring on twigs of *Aesculus hippocastanum*, is described. It differs from *Diaporthe* in the dark colored spores.—H. S. Jackson.

2070. SKAIFE, S. H. Notes on some South African Entomophthoraceae. Trans. Roy. Soc. South Africa 9: 77-86. Pl. 2-4. 1921.—Records of South African Entomophthoraceae published up to the present are confined to writings on the locust fungus, *Empusa grylli*. In the present paper the occurrence of 6 species is recorded and notes have been made on their morphology. These species are: *Empusa muscae*, *E. conglomerata*, *E. grylli*, *Entomophthora aphidis*, *E. apiculata*, and *E. megasperma*.—E. M. Doidge.

2071. STORK, HARVEY E. Biology, morphology and cytoplasmic structure of *Aleurodiscus*. Amer. Jour. Bot. 7: 445-456. 3 pl. 1920.—*Aleurodiscus amorphus* grows on twigs and small branches of fallen balsam fir. A small species of *Tremella* is often parasitic on the fruiting bodies of this species, sometimes covering them entirely. The mycelium of *Aleurodiscus* grows throughout the intercellular spaces of the bark parenchyma, originating as a mass of densely woven hyphae in the deeper tissues, from which hyphae move upward, breaking through the bark and producing the typical fruit body. In the cytoplasm are large filaments and numerous granules, which are thought to be in a class with mitochondria, metachromatic bodies, and other structures that have been described in the cytoplasm of fungi.—E. W. Sinnott.

2072. SYDOW, H., UND P. [SYDOW] Aufzählung einiger in den Provinzen Kwangtung und Kwangsi (Süd-China) gesammelter Pilze. [Enumeration of some fungi collected in the provinces of Kwangtung and Kwangsi, South China.] Ann. Mycol. 17: 140-143. 1919 [1920].—Thirty two fungi of various groups, mostly parasitic species, collected by O. A. REINKING in May and June, 1919, are listed. The following new species are described: *Physopella sinensis* on *Cudrania* sp.; *Ustilago Apludae* in spikes of *Apluda mutica* var. *aristata*; *Eutypella Paliuri* on branches of *Paliurus ramosissimus*; *Phyllachora cantoniensis* on *Litsea glutinosa*; *Helminthosporium Rhodomyrti* on *Rhodomyrtum tomentosa*. A new genus of uncertain position in the Fungi Imperfecti, Plenophysa, based on an hitherto undescribed species, *P. mirabilis*, occurring on leaves of *Ficus elastica* and *Zea mays*, is described.—H. S. Jackson

2073. SYDOW, H., UND P. [SYDOW] Über einige Uredineen mit quellbaren Membranen und erhöhter Keimporenzahl. [Concerning some Uredinales with gelatinous membrane and more than the usual number of germ pores.] Ann. Mycol. 17: 101-107. 1919 [1920].—Seven species of rusts of the Pucciniaceae having teliospores with a gelatinous outer wall and in some cases more than 1 germ pore. The authors decide that *Uredo cristata* Speg., from Paraguay on a Sapindaceae host, and *U. Toddaliae* Petch, from Ceylon on *Toddalia aculeata*, are not uredo but telio forms, the teliospore wall in each consisting of 2 layers, the inner colored and firm, the outer strongly echinulate and swelling considerably in water. For these species they establish a new genus, *Ctenoderma*. The necessity for a division of the genera *Puccinia* and *Uromyces* as now used is reviewed and the divisions proposed by ARTHUR and FISCHER are discussed. The authors give their ideas as to such divisions and propose 2 new genera, *Dichlamys* and *Trochodium*, for species of *Uromyces* with gelatinous teliospore walls. *Dichlamys* is founded on *Uromyces Trollipi* Kalchr. & McOwan, characterized by the apical germ pore and striations or ribs on the teliospores. *Trochodium* is founded on *Uromyces Ipomoeae* (Thum.) Berk. from South Africa and is characterized by apically grooved teliospores with radial ribs and a swollen pedicel. The genus *Haplopyxis* is proposed for *Uropyxis*-like rusts having 1-celled teliospores; *Uropyxis Crotolariae* Arth. is the type. The possibility of *Uromyces dubiosus* P. Henn. on *Lantana* from Brazil representing a new genus is discussed. *Puccinia Adesmiae* P. Henn. on *Adesmia trijuga* from Argentina is transferred to the genus *Cleptomyces*.—E. B. Mains.

2074. THAXTER, ROLAND. Second note on certain peculiar fungus-parasites of living insects. Bot. Gaz. 69: 1-27. 5 pl. 1920.—New genera and species are described in several groups. *Cantharosphaeria* is a new genus of true ascomycetes, 1 species, *C. chilensis*, being described; this may be saprophytic, but the species noted below are certainly parasites. *Termitaria* is a new genus of the Fungi Imperfecti, perhaps referable to the Leptostromataceae, but quite isolated in its characters; *T. Snyderi* and *T. coronata* are described. In *Muiogone*

and *Muiaria*, previously described genera of the Dematiaceae, *Muiogone Medusae*, *Muiaria curvata* and *M. fasciculata* are described as new. *Aposporella* is a new genus of the Mucedineae, 1 species, *A. elegans*, being described. Of uncertain affinities are the new genera *Coreomycetopsis* (1 species, *C. oedipus*, being described), *Endosporella* (with 1 species, *E. Diopsidis*), and *Laboulbeniopsis* (with 1 species, *L. Termitarius*). New species of previously described genera, also of uncertain affinity, are *Thaxteriola nigromarginata*, *Amphoromorpha Blattina*, and *Enterobryus compressus*.—H. C. Cowles.

2075. THOM, CHARLES, AND MARGARET B. CHURCH. *Aspergillus flavus*, *A. oryzae*, and associated species. Amer. Jour. Bot. 8: 103-126. 1 fig. 1921.—Fermented food products from the Orient show a number of types of *Aspergillus*, some of the more characteristic and important of which were studied in cultures. These are *A. flavus*, *A. oryzae*, *A. parasiticus*, *A. effusus*, *A. Wentii*, *A. tanari*, *A. terricola*, and *A. citrisporus*. Detailed cultural descriptions of these species are presented and their nomenclature, with that of related species, is discussed. A new variety, *A. terricola* var. *americana* Marchal is described.—E. W. Sinnott.

2076. WILL, H. Altes und Neues über die Riesenkolonien der Saccharomyceten, Mycoderma Arten und Torulaceen. [Some observations regarding giant colonies of *Saccharomyces*, *Mycoderma* spp. and *Torulaceae*.] Centralbl. Bakt. II Abt. 50: 1-23, 294-310, 317-335, 410-415. Pl. 3. 1920.—In this series of articles the author sums up the observations made by him on a large number of so-called giant colonies of the more commonly known species of *Saccharomyces*, *Pichia*, *Willia*, *Mycoderma*, and *Torulaceae*. He describes in great detail these giant colonies, which occur both on solid and liquid media; the factors which influence the development of the different growth forms; the zone formation which is very general in species of *Saccharomyces*; and finally classifies the giant colonies into fundamental types. The author thinks that these colonies represent one of the most important diagnostic characters for organisms of this type.—Anthony Berg.

2077. YASUDA, ATSUSHI. Eine neue Art von *Hypocrea*. Bot. Mag. Tôkyô 34: 1, 2. 2 photo. 1920.—*Hypocrea japonica* Yasuda is described and illustrated.—L. L. Burlingame.

LICHENS

2078. BACHMANN, E. Die Beziehung der Knochenflechten zu ihre Unterlage. [The relation of the bone lichens to the substratum.] Centralbl. Bakt. II Abt. 50: 368-379. Fig. 9. 1920.—The term bone lichen should not be given the same value as the commonly adopted term lime lichen as this latter form, at least the endolithic type, can use only calcium carbonate as a substratum while the bone lichen is found only occasionally upon bone, more commonly on wood, stone, or earth. The object of the present investigation was to determine the relation of these lichens to their newly adopted substratum. Three species were examined, *Bacidia albicans* (Hepp) Zwachk; *Lecidea goniophilia* Flk.; and *Caloplaca pyracea* (Ach.). Of these only the last is a lime lichen. Examination of *Bacidia albicans* on bones from 3 localities showed that the lichen was attached externally only as in the exolithic lichens *Catillaria micrococca* and *Bacidia Arnoldia* upon lime and *Scoliosporum compactum* and *S. umbrinum* on silicate rock. However, due to the great porosity of some bone substances the lichen forces its way into and partly fills the pores and galleries. Its growth upon bone free from pores is exolithic; upon highly porous bone, partly exotitic and partly hypostitic. *Lecidea goniophilia* exists also exotitically and hypostitically on bone, never as an epilithic or even as an endolithic lichen upon lime. *Caloplaca pyracea* (Ach.), which grows epilithically on lime stone, does not dissolve the bone substances, but seems to possess a greater mechanical power of forcing itself deeper into the pores of the substratum than does *Lecidea goniophilia*. The thalli of these lichens when grown on bone develop more vigorously and contain more gonidia than when growing on lime or some barks. Bone is therefore a very favorable substratum for the development of lichens, not because it furnishes certain nutrients but because of its great capacity of absorbing and retaining water.—Anthony Berg.

2079. LETTAU, G. *Schweizer Flechten. I.* [Swiss lichens I.] *Hedwigia* 60: 84-128. 1918.—Lists of lichens collected at various points in Switzerland, with descriptive notes. [See also following entry.]—*H. M. Fitzpatrick.*

2080. LETTAU, G. *Schweizer Flechten. II.* [Swiss lichens II.] *Hedwigia* 60: 267-312. 1919.—A continuation of a previous paper by the author (see preceding entry), and giving lists of lichens with descriptive notes, based on collections made at additional points in Switzerland.—*H. M. Fitzpatrick.*

2081. ZAHLBRUCKNER, A. *Flechtensystematische Studien. I. Die Flechtengattung Rhabdospora Müll. Arg.* [Systematic studies on lichens. I. The lichen genus *Rhabdospora*.] *Hedwigia* 59: 301-304, 305, 306. 2 fig. 1917, 1918.—A critical study of the morphology of the thallus and fruit-body. The genus is said to differ from *Bactrospora* in that the algal component belongs to the Cyanophyceae, and in that the fruit-body is pyrenocarp.—*H. M. Fitzpatrick.*

2082. ZSCHACKE, HERMANN. *Die mitteleuropäischen Verrucariaceen.* [The Verrucariaceae of middle Europe.] *Hedwigia* 60: 1-9. 1918.—Brief notes on species of *Staurothele* and *Polyblastia*.—*H. M. Fitzpatrick.*

BACTERIA

2083. BARNES, W. H. The activity of staphylococci in milk. *Jour. Infect. Diseases* 28: 259-264. 1921.—The growth of staphylococci in milk is suggested as a factor in their classification, due to the variety of reactions obtained.—*Selman A. Waksman.*

2084. HANER, R. C., AND W. D. FROST. The characteristics of the microcolonies of some pathogenic cocci. *Jour. Infect. Diseases* 28: 270-274. 2 pl. 1921.—A new method of drying down and staining colonies of bacteria only a few hours old is described and a study is made of microcolonies of some staphylococci, streptococci, and pneumococci.—*Selman A. Waksman.*

2085. RAHN, OTTO. *Versuche einer natürlichen Gruppierung der Bakterien.* [An attempt at presenting a natural classification of the bacteria.] *Centralbl. Bakt. II Abt.* 50: 273-293. Fig. 2. 1920.—A theoretical discussion of the origin and inter-relationships of the various groups of the bacteria. No detailed system of classification is outlined, the results of the inquiry being chiefly negative.—*H. M. Fitzpatrick.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, Editor

(See also in this issue Entries 2007, 2008)

2086. ARBER, E. A. NEWELL. *Devonian floras, a study of the origin of Cormophyta.* 100 p., 47 fig. Cambridge Univ. Press: 1921.—An incomplete summary of Devonian plants results in considering them to represent 2 radically different types,—an earlier, termed the Psilophyton flora or Procormophyta, and a later, termed the Archaeopteris flora. The former, possibly comprising the genera *Psilophyton* (which Arber considers identical with the petrified material known as *Rhynia*), *Ptilophyton*, *Thursophyton*, *Barrandeina*, *Barinophyton*, and *Taenioocrada*, are considered as Thallopiphyta which anatomically were intermediate between algae and vascular plants. The latter, comprising the genera *Sphenophyllum*, *Pseudobornia*, *Archaeopteris*, *Rhacopteris*, *Bothrodendron*, etc., are considered true pteridophytic plants closely related to their descendants of the Lower Carboniferous.—The *Sphenophyllum*-*Calamite*-*Equisetum* line, the fern line, and the *Lepidodendron*-*Sigillaria*-*Lycopod* line are considered unrelated and independent derivatives of algal ancestors. The existing Psilotales are considered to represent a relatively modern group resulting from the transmigration of algae and not related to the Psilophytales, and the Bryophyta are considered to have had a like indepen-

dent origin late in geologic time. The complex wood of seed plants of the Cordaitan plexus in Devonian time is ignored. The stages in the evolution of steles are considered to be from a monarch type consisting of a single protoxylem group and formed by the simultaneous modification of a set of procambial elements, occurring independently in the axis and branches. Second, by the substitution of continuous for purely initial transformation; and third, by the formation of secondary cambium and secondary wood.—*E. W. Berry.*

2087. BENSON, W. N., W. S. DUN, AND W. R. BROWNE. Part IX. The geology, palaeontology and petrography of the Currabubula district, with notes on adjacent regions. B. Palaeontology, including CHAPMAN, F. Appendix. Lower Carboniferous limestone fossils. Proc. Linn. Soc. New South Wales 45: 337-374. Pl. 18-24, fig. 10-17. 1920.—Mention is made of leaf impressions of *Rhacopteris*, *Ancinities*, and *Archaeocalamites*, and descriptions are given of 2 sets of silicified plant remains. LAWSON is credited with the descriptions. Chapman also reports the presence of the thread-like thallus of a species of *Girvanella* (Cyanophyceae) in oolitic limestone from the Lower Carboniferous. Besides the fine tube of the thallus he observed here and there indications of strings of minute globular cells (probably reproductive).—*Eloise Gerry.*

2088. CARPENTIER, A. Notes Paléophytologiques sur le Westphalien du Nord de la France. [Paleophytological notes on the Westphalian of the north of France.] Ann. Soc. Géol. Nord. 44: 137-150. Fig. 3, pl. 2. 1920.—Five sigillarias including 2 new varieties, 1 lepidodendron, 4 ferns including a new *Taeniopteris* (?), and a seed called *Neuropterocarpus* which is associated with the fronds of *Neuropteris rarineris*, are described from the Westphalian stage (Carboniferous) of the Departments of Nord and Pas-de-Calais in France.—*E. W. Berry.*

2089. FRITEL, P. H. Sur la présence des genres *Phragmites* Trin. et *Nephrodium* L. C. Rich. dans les argiles pleistocenes de Benenitra (Madagascar). [On the presence of *Phragmites* and *Nephrodium* in the Pleistocene clays of Benenitra in Madagascar.] Compt. Rend. Acad. Sci. Paris 171: 1389-1390. 1920.

2090. MACBRIDE, E. W. Recapitulation and descent. Nature 106: 280-281. 1920.

2091. NUTTING, C. C. Is Darwin shorn? Sci. Monthly 12: 127-136. 1921.—This is a criticism of "A critical glance at Darwin" by John Burroughs in the August (1920) number of the Atlantic Monthly.—DEVRIES, JENNINGS, CASTLE, WILSON and DAVID STARR JORDAN are quoted to show that Darwin's theory of natural selection is not repudiated by scientists.—*L. Pace.*

2092. SCOTT, D. H. Studies in fossil botany. Vol. 1. Pteridophyta. 3rd ed., xiii + 434 p., 190 illus. A. & C. Black Ltd.: London, 1920.—The 3rd edition of this well known text contains little that was not in the 2nd edition except for a summary of the results of the work of KIDSTON & LANG on the petrified Devonian plants from the Rhynie chert of Scotland. These are recognized as constituting the basis for a new order—the Psilophytales, as proposed by the authors mentioned.—*E. W. Berry.*

2093. WALKOM, A. B. Mesozoic Floras of New South Wales. Pt. 1. Fossil plants from Cockabutta Mountain and Talbragar. Mem. Geol. Surv. New South Wales Palaeontol. 12: 1-21. 7 pl. 1921.—A number of Mesozoic types, largely cosmopolitan forms, are recorded. The genera represented are *Cladophlebis*, *Coniopteris*, *Thinnfeldia*, *Taeniopteris*, *Podozamites*, *Araucarites*, *Brachyphyllum* (?), *Elatocladus*, and *Pagiophyllum* (?). *Araucarites grandis*, based on a large cone-scale, and *Thinnfeldia talbragarensis* and *T. pinnata*, are described as new. Attention is called to the absence of all traces of *Ginkgo* and *Baiera*. The flora is considered to be of Jurassic, and probably lower Jurassic, age.—*E. W. Berry.*

PATHOLOGY

G. H. COONS, *Editor*C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 1606, 1614, 1618, 1842, 1930, 1937, 1959, 1968, 1974, 1997, 1998, 2061, 2063, 2065, 2067, 2069, 2071, 2072, 2188, 2195, 2202, 2227)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

2094. ANONYMOUS. The mosaic disease of the sugar cane in Trinidad. [Rev. of: WILLIAMS, C. B. The mosaic disease of the sugar cane in Trinidad. Bull. Dept. Agric. Trinidad and Tobago 19, part 1. 1920.] Internat. Sugar Jour. 23: 74-75. 1921.

2095. KIRBY, R. S., AND H. E. THOMAS. The take-all disease of wheat in New York State. Science 52: 368. 1920.—Early in July 1920 attention was attracted to a small spot in a field of soft, red, winter wheat at East Rochester, New York. The plants were badly dwarfed and prematurely dead. In many cases secondary culms had been killed. Laboratory examination showed that the roots of the plants were rotted, and that the lower internodes were dark or entirely blackened and enveloped by a dense sheath-like plate of brown mycelium. Perithecia were found embedded in the leaf sheath and mycelial plate. Microscopic measurements of perithecia and ascospores agree very closely with those given by Saccardo for *Ophiobolus graminis*. Steps were taken to determine the source of infection and to completely eradicate the disease. No other evidence of take-all disease was found on this farm or on those in the vicinity. The crop from an area 40 feet in diameter was spread over the ground, gasoline was poured over the infected spot and vicinity, and the whole was then burned over.—A. H. Chivers.

2096. LEE, H. ATHERTON, AND MARINO G. MEDALLA. La enfermedad banda amarillo en Filipinas. The yellow stripe disease in the Philippines.] Sugar 23: 53-54. 1921.—Mosaic or yellow stripe disease of sugar cane as it occurs in various sugar countries is described with a brief mention of different control measures.—C. W. Edgerton.

2097. McCUBBIN, W. A. The potato wart situation. Potato Mag. 3³: 5, 26-28. 2 fig. 1921.—The wart disease of potato (*Solanum tuberosum*) has been found in U. S. A. in 3 states, 58 towns and villages, and about 800 gardens covering less than 100 acres. Quarantine measures are in force, but need to be re-enforced by more complete surveys and by more feasible eradication methods than now exist. Immune varieties are being studied.—Donald Folsom.

2098. MONTEMARTINI, L. Alcune malattie nuove o rare osservate nel Laboratorio di Patologia Vegetale di Milano 22-26. [Some new or rare diseases observed in the Laboratory of Vegetable Pathology of Milan Nos. 22-26.] Rev. Patol. Veg. 10: 119-125. 1920.—A *Macrosporium* was found on the leaves of *Robinia pseudacacia* that were drying up, beginning at the margins and running in between the principal veins. Observations were made on the attack of the fungus *Clasterosporium amygdalearum* on an apricot tree that had remained immune though surrounded by severely affected cherries. However, it also was attacked when severely pruned. The pomegranate is described as a new host of *Hadrotrichum populi*. *Phyllosticta macrocarpa* is described as a new species causing a leaf spot that runs in between the lobes of the leaves of *Quercus macrocarpa*. A new form of a rust is described, based on the longer peridia of the aecia, namely, *Gymnosporangium clavariaeforme* (Jacq.) Rees f. *longissima* Montem., on *Crataegus oxyacantha*.—F. M. Blodgett.

2099. SIMMONDS, H. W., AND C. H. KNOWLES. A disease of *Clidemia hirta* in the lower Rewa District. Dept. Agric. Fiji Circ. 1. 9-12. 1920.—A disease was found to be destroying the plants of *Clidemia hirta*, which is a bad weed in this region. The external appearance of the diseased and dead plants is described. Efforts were made to determine the causal organ-

ism, but these have not yet been successful. It is thought that a species of *Heterodera* is primarily responsible.—C. V. Piper.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

2100. HARVEY, R. B. Destruction of zoospores of plant disease organisms by natural enemies. *Science* 52: 84. 1920.—In making motion-picture photomicrographs of the liberation of zoospores from the sporangia of *Physoderma zeae-maydis*, the author observed destruction of the zoospores by certain animalcules which are commonly found in decaying vegetable material. The number of zoospores swallowed by one rotifer (*Proales* sp.) is very large. In starting with dry material collected from corn stalks infested with *Physoderma*, the animalcules appear first, and are on hand for each crop of zoospores.—A. H. Chivers.

2101. RAVAZ, L. Rapport sur le fonctionnement de la station d'avertissements agricoles de Montpellier, en 1918. [Report of the Agricultural Experiment Station of Montpellier, 1918.] *Ann. École Nation. Agric. Montpellier* 17: 131-167. *Fig. 1-27*. 1918 [1919].—The main part of the report is devoted to work with grape mildew (*Plasmopara viticola*). Temperature and humidity are considered the most important factors concerned in the development of this disease, and for this reason meteorological data are reported from various points in the grape-growing section. A minor part of the report consists of observations made on black rot [*Guignardia bidwellii*] and insects. A historical review of the station is also given.—F. F. Halma.

2102. SHUNK, I. V., AND F. A. WOLF. Further studies on bacterial blight of soybean. *Phytopath.* 11: 18-24. *Fig. 1*. 1921.—A comparison of the pathological symptoms of the bacterial blight of soybean (*Soja max*) described by COERPER in Wisconsin and that described by Wolf in North Carolina has shown only minor differences in the appearance of the diseased spots; but differences in the reactions and growth characteristics on various culture media were sufficient to prove the causal organisms distinct. The two diseases, one produced by *Bacterium glycinum* Coerper and the other by *B. sojae* Wolf, are found in Wisconsin, but only the one produced by the latter organism has been found in North Carolina.—B. B. Higgins.

2103. THOMAS, H. E. The relation of the host and other factors to infection of *Apium graveolens* by *Septoria apii*. *Bull. Torrey Bot. Club* 48: 1-29. 1921.—The idea of specificity in the relation of plant parasites to their hosts is coming to be one that must be reckoned with; the obligate parasite is restricted in its host range and a slight change in either host or fungus may completely change the virulence of the parasite or its effect on the host. Data are presented in this paper to show that the infection of *Apium graveolens* by *Septoria apii* is favored by conditions which accelerate the growth of the host. Work with many hosts showed a high degree of specialization on the part of the parasite in its inability to cause infection. Experiments were conducted on host plants treated with various solutions to produce different degrees of health and vigor. Plants suffering from nematodes, and etiolated plants, were also used. The parasite's development was favored by increased growth in the host and showed a high degree of specialization. This specialization suggests promise for experiments in breeding for resistance.—P. A. Munz.

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

2104. SCHLUMBERGER, O. Pflanzenschutz und Sortenfrage im Kartoffelbau. [The question of varieties and disease resistance in potato culture.] *Fühling's Landw. Zeitg.* 69: 144-149. 1920.—A general discussion of the problem of obtaining disease-resistant varieties of potatoes is presented. Pathological investigations of potato diseases and physiological studies of diseased and disease-resistant varieties or individual plants to determine the underlying causes of resistance or susceptibility to disease should be carried on in a systematic way to

arrive at fundamental principles upon which selection of disease-resistant sorts may be based. All new introductions should be tested in localities where particular diseases are prevalent.—*A. T. Wiancko.*

DESCRIPTIVE PLANT PATHOLOGY

2105. ANONYMOUS. The menace of the white pine blister rust. *Amer. Forestry* 27: 6. 1921.

2106. BIJL, P. A. VAN DER. Notes on some sugar cane matters. *Jour. Dept. Agric. Union of South Africa* 2: 122-128. *Fig. 1-5.* 1921.—Notes are given on the root disease caused by *Himantia stellifera*, leaf diseases (due to *Leptosphaeria sacchari* and *Helmintosporium sacchari*), and the stalk diseases caused by *Melanconium sacchari* and *Cephalosporium sacchari*. Reference is also made to the non-setting of seed in Uba and other cane varieties in South Africa.—*E. M. Doidge.*

2107. BOTTOMLEY, A. M., AND K. A. CARLSON. Parasitic attack on *Eucalyptus globulus*. A note on *Stereum hirsutum* in plantations in the Transvaal. *Jour. Dept. Agric. Union of South Africa* 1: 852-858. *Pl. 1-2.* 1920.—A parasitic attack of *Stereum hirsutum* on *Eucalyptus globulus* in gum plantations on the farm Cliffendale near Roodepoort is described. The disease is confined to stem tissues where it produces a characteristic soft dry rot which renders the timber useless for industrial purposes. An examination of the above and other plantations showed that the fungus was common as a saprophyte on old stumps and that Cliffendale was the only locality where it had become parasitic; and further that *E. globulus* was the only species of gum susceptible to the disease. The attack in this case was thought to be due probably to lack of vigor in the trees occasioned by unsuitable local conditions of soil or climate or both. Control measures advocated consist in growing only those species found to be most suitable to the area in question and in the destruction of all infected stumps by means of the saltpeter and kerosene oil method.—*A. M. Bottomley.*

2108. BROOKS, F. T., AND M. A. BAILEY. Silver leaf disease (including observations upon the injection of trees with antiseptics). *Jour. Pomology* 1: 81-103. 1920.—Reprinted with abridgments from *Jour. Agric. Sci.* 9: 189-215. 1919.—*L. H. MacDaniels.*

2109. CHEEL, EDWIN, AND J. B. CLELAND. Disease in forest trees caused by the larger fungi. *Forest. Commission New South Wales Bull.* 12. 12 p., *pl. 1-20.* 1918.—The author emphasizes the importance of the study of fungi causing decay of living trees, stored lumber, and building timbers, giving non-technical descriptions of various members of the genera *Armillaria*, *Pholiota*, *Polyporus*, *Polystictus*, *Fomes*, *Hexagona*, and *Trametes* which have been found or may be found causing decay of important woods. The plates illustrate the rots produced by, or the sporophores of, the following forms: *Armillaria mellea*, *Pholiota adiposa*, *Polyporus eucalyptorum*, *P. ochroleucus*, *P. gilvus*, *P. dryadeus*, *P. salignus*, *Polystictus versicolor*, *Fomes robustus*, *F. applanatus* var. *australis*, and *Trametes lactinea*.—*Reginald H. Colley.*

2110. DOIDGE, E. M. A tomato canker. *Jour. Dept. Agric. Union of South Africa* 1: 718-721. 1 *fig.* 1920.—A popular account of a bacterial disease of tomatoes caused by *Bacterium vesicatorium*.—*E. M. Doidge.*

2111. DUFRENOY, JEAN. Witches'-brooms of *Pinus maritima*. *Phytopathology* 11: 27. 1921.—Examination of hypertrophied tissues from witches'-brooms occurring on *Pinus maritima* in southwestern France showed the cambial cells generally infested by bacteria, which, when inoculated into young buds of *P. maritima*, killed the buds but failed to produce witches'-brooms.—*B. B. Higgins.*

2112. FRYER, P. J. Insect pest and fungus diseases of fruit and hops. *xv + 728 p., 24 colored pl., 305 fig.* Cambridge University Press: London, 1920.—The author has prepared

a "complete manual for growers," with the following plan of presentation. The book is divided into 11 "sections," distributed in 3 "parts":—Sect. I, Introduction; Sect. II, How fruit trees live. PART I, Insect pests and their control: Sect. III, About insects; Sect. IV, Insect pests; Sect. V, Insecticides; Sect. VI, Beneficial insects. PART II, Fungus diseases of fruit and their control: Sect. VII, Fungus diseases; Sect. VIII, Fungicides. PART III, Spraying in theory and practice: Sect. IX, Spraying appliances and methods; Sect. X, Spraying calendar; Sect. XI, Tables and appendices. Pests are considered by groups, and for each pest the data are presented in simple language in accordance with a standard outline. The first 476 pages of the book are used in the discussion of insect pests and their control. Fungus diseases of the apple, cherry, currant, gooseberry, hop, peach, pear, plum, raspberry, strawberry, and grape are considered in the following 151 pages. In the case of each fungus disease the data are presented wherever possible in a standard manner similar in plan to the scheme used in the section on insect pests. The description of spraying methods and outfits is comprehensive. The last 2 sections in the book are arranged so that the grower may easily find information on the spraying calendar or the tables of equivalents.—*Reginald H. Colley.*

2113. GRIESBECK, A. *Die Erreger der Schwartzeinigkeit bei Kartoffeln.* [The causes of blackleg in potatoes.] *Fühling's Landw. Zeitg.* 69: 37-38. 1920.—While APPEL found *Bacillus phytophthorus* to be a cause of blackleg in potatoes he indicated that other organisms might contribute to the disease. The present author found that hollow places in the earth beside the potato stems caused by burrowing animals such as mice and moles were associated with the appearance of the disease. It is supposed that injury to the stem or merely the existence of the hollow space beside the stem causes dying of the tissues and gives access to moulds and rotting bacteria. It is suggested that hoeing to break up the animal burrows would cause partially affected stems to recover and that ridding the land of these burrowing animals would effectively control the disease.—*A. T. Wiancko.*

2114. MABEE, W. B., AND R. A. JEHLE. *Insect pests and diseases of apples in North Carolina and their control.* *Bull. North Carolina Dept. Agric.* 1921³: 1-24. 1921.—A popular illustrated account of apple scab, blotch, blackrot, bitter rot, sooty blotch, rust, stippen, and fire blight of apples, with remedial and control measures.—*F. A. Wolf.*

2115. NORTON, J. B. S., AND C. C. CHEN. *Another corn seed parasite.* *Science* 52: 250. 1920.—A fungus which seems to have been given little consideration as a parasite has recently been isolated by the authors from sweet corn seed. The fungus was frequently found in corn from a field that had many dwarf, distorted, and barren stalks, and some root rot. The fungus has been isolated and its pathogenicity tested. The tests show the same effects as in the field. The fungus corresponds very well with descriptions and figures of *Oospora verticilloides*. It is probable that the fungus has been recorded under other names.—*A. H. Chivers.*

2116. NOWELL, W., AND C. B. WILLIAMS. *Sugar cane blight in Trinidad.* [Reprint of *Bull. Dept. Agric. Trinidad and Tobago* 19, part 1. 1920.] *Internat. Sugar Jour.* 23: 154-155. 1921.—The fungi causing root disease of sugar cane, at present known in Trinidad, belong to the genera *Marasmius* and *Odontia*. They occur to some extent in all cane fields and become serious when the vigor of the cane is decreased by adverse factors. The prevalence of root disease over wide areas in Trinidad, reported last year, is due to the weakening of the cane by attacks of froghopper. The effect of root disease with or following froghopper injury prevents recovery of the cane. Control measures suggested are the reduction of the ratooning period, improved cultivation, manuring, and rotation of crops.—*C. Rumbold.*

2117. POETEREN, N. VAN. *De Aardappelwratziekte.* [Potato wart.] *Tijdschr. Plantenz.* 27: 1-13. *Fig. 1-7.* 1921.—A general discussion of potato wart (*Chrysophlyctis endobiotica*), including symptoms, cause, mode of dissemination, importance, distribution in general and in Holland, eradication, and legislative measures in Holland for the eradication of the disease. Distribution of this disease in Holland is limited to 5 townships which are located on the Ger-

man border. Experiments with resistant varieties are under way; so far, only the variety Ceres has proved resistant. The legislative measures are strict and far reaching, and complete eradication of the disease in Holland is being attempted.—*D. Alanasoff.*

2118. QUANJER, H. M. *Considerations nouvelles sur les maladies de la pomme de terre.* [Recent work on the diseases of potato.] Bull. Soc. Path. Veg. France 7: 102-118. 1920.—An address given under the auspices of the Phytopathological Society of France in Paris. A résumé of the recent work on the principal diseases of the potato is given with special attention to the mosaic disease and the results of the author's investigations which have already been published elsewhere.—*C. L. Shear.*

2119. SALISBURY, E. J. [Rev. of: BUTLER, E. J. *Fungi and disease in plants.* vi + 547 p., 5 pl., 205 fig. Thacker, Spink & Co.: Calcutta and Simla, 1918.] Sci. Prog. [London] 13: 677-678. 1919.

ERADICATION AND CONTROL

2120. ANONYMOUS. *Broeiproeven van tegen aaltjesziek behandelde Narcissenbollen.* [Heating experiments with nematodes in narcissus bulbs.] Weekbl. Bloembollencult. 30: 303, 312. 1920.—A number of narcissus bulbs were kept for 1, 2, and 3 hours in water at 110-111°F. to destroy nematodes. Treatment for 1 or 2 hours gave best results. Experiments were carried on with the following varieties: King Alfred, Emperor, Golden Spur, and N. Leeds Lucifer.—*J. C. Th. Uphof.*

2121. ANONYMOUS. *Control of the white pine blister rust.* Bien. Rept. New Hampshire State Forest. Commission 1919-1920: 39-52. 1920.—A systematic survey, begun with the discovery of the disease in 1916 and continued through 1920, has proved that the white pine blister rust is generally distributed in the pine regions of the state. As examples of the degree of infection the following cases may be cited: On a narrow strip 70 miles long in the Ammonoosuc Valley, 24 per cent of the pines were diseased; in the same region, on a plot of 43 acres, 55 per cent of the pines were diseased; both cultivated and wild *Ribes* were found to be generally infected in all areas scouted. There is only one known and proved method of checking the rust, and that is the removal of all *Ribes*. The amount of eradication work and the cost for 1917 compared with that of 1920, and the total work done, are shown in the table.

YEAR	TOWNS WORKED	ACRES COVERED	AVERAGE COST PER ACRE	WILD BUSHES DESTROYED	CULTIVATED BUSHES DESTROYED
1917.....	4	23,043	\$0.42	462,500	500
1920.....	49	203,641	0.175	2,057,936	21,298
1917 to 1920 total		457,389	0.227	5,139,704	51,396

A table giving the 1919 and 1920 costs for the individual towns is appended. The actual cost to the state for eradication of approximately half a million acres was about \$.05 per acre, the rest of the funds being furnished through cooperative agreement by the Federal government and the towns. Improved methods of advance surveys by men who mark areas requiring the attention of crews have reduced the cost and made possible the covering of a much larger acreage. The crews averaged better than 96 per cent eradicating efficiency. At the present rate 7 or 8 years more will be required to eradicate *Ribes* spp., from the whole state; and in view of the heavy potential loss to pine owners the work should be continued with all the funds which can be made available.—*Reginald H. Colley.*

2122. BRITTON, W. E., AND G. P. CLINTON. *Spray calendar.* Connecticut [New Haven] Agric. Exp. Sta. Bull. 224. 67-110. 1921.—This is the 5th revision of the spray calendar issued by the station. It includes brief descriptions, with preventive measures, of insects and fungi attacking 98 species of plants growing in the state. Methods are given for the prep-

aration of 16 insecticides and fungicides, 7 commonly used fungicides, and 6 less commonly used ones. Lists of manufacturers and dealers in spray machines and spray materials are included.—*Henry Dorsey.*

2123. CHEYNEY, E. G. Preliminary investigation of *Ribes* as a controlling factor in the spread of white pine blister rust. *Science* 52:342-345. 1920.—The control of white pine blister rust, or rather the protection of white pine, depends on a definite knowledge of the habits of species of *Ribes*, especially of the wild plants. Projects were therefore planned to cover the following points: (1) To study the sprouting of different species of *Ribes* eradicated in different months and under different moisture conditions; (2) to study the cost and effectiveness of eradication in different months; (3) to determine the number of years eradication will have to be practiced; (4) to study the reproduction of different species of *Ribes* by seed and layering; (5) to determine the effect of pruning and cutting off the roots at different depths and at different dates; (6) to determine growth habits of different species. From experiments on the areas selected, namely, the Rush Lake region, Minnesota, the following results, though not conclusive, are significant: There was a higher percentage of sprouts from plants eradicated on the moist type of soil than on the dry or swamp types; a larger percentage of sprouts from plants which were grubbed than from plants which were pulled; tendency to sprout from the root ends seemed much stronger in plants pulled in May and June than late in summer; plants cut off above the crown almost invariably sprouted in all types and at all seasons, with the exception of the swamp species, *R. triste*. The number of large plants missed by eradication crews was very small (less than 5 per cent). The number of seedlings left was very much larger, but the leaf surface of these is very small. None of these seedlings was found to be infected, and is it questionable whether they live over to the second season in large numbers. It has been the practice in the state to pull the plants whenever possible rather than to grub them. Evidence indicates that the reverse practice would be preferable since it seems to be a fact that practically all sprouts come from pieces of crowns and from root ends which are exposed to light.—*A. H. Chivers.*

2124. DETWILER, S. B. Safeguarding the white pine crop. *Amer. Forestry* 27: 7-11. 8 fig. 1921.—A résumé of the conclusions reached by the Sixth Annual International Blister Rust Conference held in Boston, Massachusetts, under the auspices of the American Plant Pest Committee. It was the opinion of the conference that a zone 200-300 yards in width cleared of currant and gooseberry bushes, will insure the commercial growing of white pines under average conditions. In 1920 the cost of control in all states averaged 35 cents per acre as compared with 54 cents in 1919 and 66 cents in 1918. These figures include labor, supervision, and transportation of field men.—*Chas. H. Otis.*

2125. FIELDS, W. S., AND JOHN A. ELLIOTT. Making Bordeaux mixture, and some other spraying problems. *Arkansas Agric. Exp. Sta. Bull.* 172. 12 p., 1 pl. 1920.—The effect of different methods of mixing on the settling and deterioration of Bordeaux mixture is shown in tables and figures. Recommendation is made to dilute the CuSO_4 solution in the spray tank and to add the milk of lime while agitating the dilute copper solution. No appreciable differences in times of settling of lead arsenate in Bordeaux mixture and in lime-sulphur solution were found with waters of different degrees of hardness.—*John A. Elliott.*

2126. MELHUS, I. E., AND J. C. GILMAN. Measuring certain variable factors in potato seed treatment experiments. *Phytopath.* 11:6-17. Fig. 1-5. 1921.—The 3 principal variable factors affecting the value of potato (*Solanum tuberosum*) seed treatment are: The presence of living pathogenes on the tubers after treatment; the continued antiseptic action of the solution used in the treatment; and the percentage of infection resulting from pathogenes already in the soil.—To study the 1st of these variables, scabby tubers were treated with solutions of formaldehyde and of HgCl_2 , varying the temperature, the strength of the solution, and the time of exposure. Tissue from scab sori of the treated and the untreated tubers was then plated and the numbers of resulting colonies of the scab organism (*Actinomyces scabies*) compared. Tubers dipped for $2\frac{1}{2}$ minutes in formaldehyde solution 1-120 at a temperature

of 50°C., and covered for 1 hour, were the only ones completely sterilized. It was found, however, that enough HgCl_2 solution remained on the surface of the tubers to exert a decided antiseptic action.—Similar tests were also made with both *Rhizoctonia solani* and *Spondylocladium atrovirens*.—By running a large number of checks with treated and untreated seed, it was found possible to measure the percentage of infection resulting from the presence of *Rhizoctonia* and *Actinomyces* in the soil.—*B. B. Higgins*.

2127. MÜLLER-THURGAU, H., UND A. OSTERWALDER. **Versuche zur Bekämpfung der Kohlhernie** [Experiments on the control of club root of cabbage.] Landw. Jahrb. Schweiz 1919: 1-22. Fig. 1-7. 1919.—Experiments on the control of club root (*Plasmiodiophora brassicae*) in kohlrabi and cabbage are described. Different forms of lime, sulphur and formalin were applied to the soil in various amounts. Burned lime and hydrated lime are said to have given satisfactory results.—*J. D. Luckett*.

2128. SANDERS, G. E., AND A. KELSALL. **Dusts and dusting for insect and fungus control.** Sci. Agric. [Canada] 1: 14-18. 1921.—This article gives results of dusting experiments in Nova Scotian orchards.—*B. T. Dickson*.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

2129. CHURCH, MARGARET B. **The relation of mosaic disease to pickling of cucumbers.** Phytopath. 11: 28-29. 1921.—Cucumbers visibly affected with mosaic disease do not make good dill pickles. They do not clear up properly in the brine.—*B. B. Higgins*.

2130. REDDICK, D. **Foot rot of tomato.** Phytopathology 11: 29. 1921.—The name "Foot rot" for the tomato disease caused by *Macrosporium solani* is claimed to be preëmpted because of previous use in connection with the disease caused by *Phytophthora cryptogea*. Use of generic names of causal organisms as descriptive adjectives is proposed.—*G. H. Coons*.

2131. [THOMPSON, M. R. H.] **Cold storage conditions for export.** Jour. Dept. Agric. Union of South Africa 2: 133-136. Fig. 1-2. 1921.—A report on the presence of organisms causing decay in fruit in cold storage rooms in Cape Town. It is stated that the condition of the rooms was satisfactory.—*E. M. Doidge*.

2132. WAGNER, ESTHER A., AND W. F. MONFORT. **Lactose broth for isolating Bacterium coli from water.** Amer. Jour. Public Health 11: 203-208. 1921.—The authors advise a broth containing 2 per cent peptone, 0.2 per cent lactose, and 0.001 per cent gentian violet, to be used with an equal volume of water. It is claimed that the use of the gentian violet makes possible sterilization of the medium by pasteurization in place of autoclaving, thus obviating the hydrolysis of the sugar which occurs at autoclave temperatures.—*C. A. Ludwig*.

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1589, 2001)

2133. ANONYMOUS. **The Mulford Biological Exploration of the Amazon Basin.** Amer. Jour. Pharm. 92: S15-S20. 1920.—A complete prospectus of the proposed Mulford Biological Exploration of the Amazon Basin, under the direction of Doctor Rusby.—*Anton Hogstad, Jr.*

2134. KREMERS, EDWARD. **Quarter of a century of chemical investigation of a typically American genus of plants.** Jour. Amer. Pharm. Assoc. 9: 1175-1176. 1920.—A portion of an address in which the author presents an explanation justifying the continuation of exhaustive research on a single genus, *Monarda*, which he has been actively engaged upon during the

past 25 years.—The author states that the horizon has grown wider and the subject more intensely interesting than ever before. He points to the recent discovery of a new terpene, possibly more correctly of 2 new terpenes; to the synthesis of new dyestuffs; and to the study of intramolecular changes of isomeric derivatives. The economic possibilities are not discussed.—*Anton Hogstad, Jr.*

2135. LLOYD, J. T. Spiders used in medicine. Amer. Jour. Pharm. 93: 18-24. Fig. 2. 1921.—An account of the use of spiders and spider webs in medicine, including a number of excerpts from historical literature on medicine. Owing to the popular lack of knowledge regarding the distinctive characteristics of spiders and insects, these characteristics are portrayed in a series of sketches. The author states he has handled large numbers of native spiders as well as hundreds of "banana tarantulas," which are not true tarantulas, and has found them all harmless. Although no chemical analyses of the spider web are known, tests have shown the absence of sugar; a slight reaction towards alkaloids has been observed. Spiders of the sub-family Aviculariinae, commonly known as "tarantulas" or bird spiders, are used by homoeopathic physicians. Until recently the web was administered in the form of a pill, but at the present time it is administered in the form of an alcoholic preparation known as "Tela Araneae."—*Anton Hogstad, Jr.*

2136. MITCHELL, D. T. Poisoning of cattle by *Diplodia*-infected maize. South African Jour. Sci. 16: 446-452. 1920.—A disease in cattle characterized by incoordination of movement and paralysis is produced by feeding mealy cobs which are infected with *Diplodia Zea*. Cultures of *D. Zea* grown on sterile maize produce clinical symptoms indistinguishable from those set up by feeding infected cobs.—*E. M. Doidge.*

2137. MITCHELL, D. T. Poisoning of cattle by feeding on *Paspalum dilatatum* infected with *Claviceps Paspali*. South African Jour. Sci. 16: 391-396. 1920.

2138. RUSSEL, G. A. Rose geranium. Jour. Amer. Pharm. Assoc. 10: 19-26. 1 pl. 1921.—The results of experiments in the culture of several varieties of rose geranium (*Pelargonium odoratissimum*) in Florida since 1914. The discussion embraces such factors as growth of plants; propagation by cuttings; cultivation; fertilization; harvesting; distilling and yield of herb and oil. The yield of oil was somewhat disappointing, varying from 0.035 to 0.109 per cent, depending upon the time of harvesting. Heavy rains were noted to cause a decrease in yield of oil. One acre yielded 16,720 pounds of fresh herb the 1st year, 7,618 the 2nd, and 4,499 the 3rd; it appears, therefore, that the amount of fresh herb obtainable decreases with each year of the life of the field.—The yield of oil per acre is not sufficiently large to warrant the cultivation of geranium as a money crop. An approximation of the possible monetary returns is presented on the basis of price paid for lowest-priced oil:

	1917	1918	1919
A	\$36-57	\$22-25	\$10-93
B	21-75	23-76	14-92

The author believes that plot B very nearly represents what may be expected from the cultivation of rose geranium as a money crop.—*Anton Hogstad, Jr.*

2139. SCHNEIDER, ALBERT. A general method for making quantitative microanalyses of vegetable drugs and related substances. Jour. Amer. Pharm. Assoc. 9: 1140-1153. 1920.—The method consists in making a count of the characteristic elements present in the substance in question, from a diluted suspension of a carefully prepared powder. After carefully grinding and mixing, 1 gr. of substance is suspended in 5 or 10 cc. of distilled water or a mixture of water and glycerine in a 25 cc. graduated cylinder. It is then thoroughly mixed with a glass rod and the cylinder filled to the 25 cc. mark with 5 per cent gum acacia solution, the entire mixture being thoroughly mixed. (Other suspending materials may be used, such as glycerine, oils, thin syrup, solution of cherry gum, solution of gum mastic, gelatin solution, india gum solution, vaseline, etc.) Of the mixture, 0.2 cc. are delivered upon a counting chamber or counting slide. The characteristic tissue elements are then counted and recorded.

Between 30 and 50 distinct fields can be counted in one mount. These findings are then compared with a standard. A list of some 78 substances with characteristic tissue elements upon which counts are to be based are included; for example, Cinchona, large bast cells; Conval-laria, number of raphides; Absinthium, T-shaped trichomes.—*Anton Hogstad, Jr.*

2140. VIEHOEVER, ARNO. Chinese Coiza. An adulterant of mustard seed. Jour. Amer. Pharm. Assoc. 10: 16-19. 3 pl. 1921.—The seeds of Chinese Colza, also known as "Golden Gate," which strikingly resemble white mustard, were offered for sale as mustard. The author has identified the Chinese Colza as *Brassica campestris chinoleifera* Viehoever. The taste is that of cabbage rather than mustard and they lack the necessary physiological characters. The fatty oil, however, can be used for technical purposes and undoubtedly, if properly re-fined, as an edible oil.—The volatile oil was present to the extent of 0.4-0.6 per cent and was identified as "crotonyl mustard oil." This oil is only slightly pungent and has the flavor of cabbage or turnip. It was found to be non-poisonous to rabbits and to lack the pronounced bactericidal properties of the true volatile oil of mustard. Analyses of the air dried seeds yielded 23 per cent protein, 11.5 per cent reducing substances, and over 40 per cent ether ex-tract. The press cake, which contains up to 10 per cent or more of fatty oil, should make a valuable feed product. The foliage should prove valuable as greens for salads, etc.—*Anton Hogstad, Jr.*

2141. YOUNGKEN, HEBER W. Pharmaceutical botany, a text book for students of pharm-acy and science. 3rd ed., 479 p., 238 fig. P. Blakiston's Son & Co.: Philadelphia, 1921.—The 1st chapter comprises 32 pages on fundamental principles of nomenclature, classification, and microtechnique. The life histories of important type forms, such as *Dryopteris Filix-mas*, *Pinus strobus*, and *Erythronium americanum*, etc., are taken up in detail. Vegetable cytology and plant tissues are discussed and illustrated by a number of new drawings. There are 98 pages dealing with plant organs and organisms. The morphology and histology of root, stem, and leaf are discussed and amply illustrated. Drawings of the various types of fruits and inflorescences are included. The portion devoted to taxonomy covers the plant kingdom from the primitive bacteria to the highest of the drug-yielding dicotyledonous fam-ilies, the Compositae. A chapter has been added on ecology, and a 24-page glossary defines the most important botanical terms used in the text.—*M. S. Dunn.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 1589, 1590, 1814, 1827, 1830, 1869, 1937, 1959, 1973, 1978, 2007, 2023, 2047, 2049, 2134, 2217)

GENERAL

2142. ANONYMOUS. [Rev. of: BAYLISS, W. M. Principles of general physiology. xxiv + 858 p., 261 fig. Longmans, Green & Co.: London, 1918.] Sci. Prog. [London] 13: 507-508. 1919.

DIFFUSION, PERMEABILITY

2143. ADAIR, GILBERT SMITHSON. The penetration of electrolytes into gels. II. The application of Fourier's linear diffusion law. Biochem. Jour. 14: 762-779. 1920.

2144. LLOYD, DOROTHY JORDAN. Note on the production of a contracting clot in a gel of gelatin at the iso-electric point. Biochem. Jour. 14: 584-585. Pl. 1. 1920.—The conclusion is reached that gelatin gels are unstable at the iso-electric point. Small quantities of NaOH have the same stabilizing influence when added to the system as HCl. The formation of stable gels therefore is only possible in the presence of an electrolyte.—*A. R. Davis.*

2145. WIGGANS, R. G. Variation in the osmotic concentration of the guard cells during the opening and closing of stomata. Amer. Jour. Bot. 8: 30-40. 7 fig. 1921.—Determinations of the osmotic concentration of the guard cells and epidermal cells of *Zebrina pendula*, *Iresine*, *Cyclamen*, and the beet were made by placing pieces of the epidermis in calcium chloride solution of different densities and noting the concentration at which plasmolysis took place. There was little change in the osmotic concentration of the epidermal cells during the day. The concentration of the guard cells increased in the early hours of sunshine and decreased in the afternoon, approaching the concentration of the epidermal cells at nightfall. It was always higher in the guard cells than in the epidermis, though the differences were not as great as those reported by ILJIN. Concentrations were in all cases higher in experiments carried on at Columbia, Missouri, than at Ithaca, New York.—E. W. Sinnott.

WATER RELATIONS

2146. JOHNSTON, E. S. A method of studying the absorption-transpiration ratio in nutrient media. Science 52: 517. 1920.—Several writers have shown that the water content of plants varies with the hour of the day. Wilting takes place when the ratio of the rate of entrance to the rate of exit is less than unity, whether caused by excessive transpiration or by a decrease in root absorption. These 2 processes may be studied by using water culture plants exposed to different environmental conditions or placed in solutions of different osmotic pressures. An experiment is described to illustrate the manner in which changes in the strength of solutions affect the ratio of absorption to transpiration.—A. H. Chivers.

MINERAL NUTRIENTS

2147. HOAGLAND, D. R. Optimum nutrient solutions for plants. Science 52: 562-564. 1920.—The author raises the following questions: (1) Is it probable that the plant has any definite response, within broad limits, to a particular ratio of salts or ions contained in the complete nutrient solution? (2) Assuming the existence of such optimum solutions, are the methods generally employed adequate to determine their composition? It has been shown previously that often the total supply of nutrients may have limited the yield, and also the insolubility of iron, when added in the form of phosphate. In connection with the first point the following experiment may be suggestive: Three nutrient solutions were used with barley; (a) solution used by the author, (b) Shive's best solution, (c) Shive's best solution diluted to $\frac{1}{3}$ of the concentration in (b). Solutions (a) and (b) gave equally favorable growth, while the smaller yield from (c) is not necessarily significant. In this experiment solutions of radically different concentrations and salt proportions have not affected yield of crop to any important extent. Certain solutions may, of course, inhibit plant growth because of unfavorable physiological balance. Nevertheless, the range of equally favorable ratios between nutrient salts is probably a very broad one, no doubt including the solutions of most soils.—A. H. Chivers.

2148. JONES, HENRY WALLACE. The distribution of iron in plant and animal tissues. Biochem. Jour. 14: 654-659. 1920.—Making use in the main of Macallum's haematoxylin method, the writer finds that inorganic iron is quite widely distributed throughout animal and vegetable tissue, the lower organisms giving the reaction much more strongly than the higher. Aquatic animals contain more such iron than terrestrial, and foetal tissues more than adult. All nuclei show the reaction.—A. R. Davis.

2149. MCCALL, A. G., AND J. R. HOAG. The hydrogen-ion concentration of certain three-salt nutrient solutions for plants. Soil Sci. 10: 481-485. Fig. 1. 1920.—Using Gillespie's method of hydrogen-ion determination it was found that in general with any one type of 3-salt nutrient solution the hydrogen-ion concentration is a function of the proportion of KH_2PO_4 present. Types of solutions containing KH_2PO_4 have a lower hydrogen-ion concentration than those containing $\text{Mg}(\text{H}_2\text{PO}_4)_2$ or $\text{Ca}(\text{H}_2\text{PO}_4)_2$. The sulphates and nitrates play

minor parts in determining the reaction of the solutions. The variations in plant growth secured in these solutions cannot be correlated with differences in hydrogen-ion concentration.—*W. J. Robbins.*

2150. TAKE, BR. *Die Entwicklung der Wurzeln und der Kalkgehalt des Bodens.* [The development of roots and the lime content of the soil.] *Fühling's Landw. Zeitg.* 69: 58–59. 1920.—This note calls attention to the fact that investigations on the subject discussed by OSWALD in his article "Untersuchungen über die Einwirkung des Grundwasserstandes auf die Eewurzelung von Wiesenpflanzen auf Moorböden" published in this journal in 1919 (see Bot. Absts. 7, Entry 638) had been carried on some 20 years ago at the Moor Experiment Station at Bremen, the last mentioned results showing that root penetration is limited by the depth to which the soil is free of acidity.—*A. T. Wiancko.*

PHOTOSYNTHESIS

2151. MAZÉ, P. *Recherches sur l'assimilation du gaz carbonique par les plantes vertes.* [Investigations on the assimilation of carbon dioxide by green plants.] *Compt. Rend. Acad. Sci. Paris* 171: 1391–1393. 1920.—This is an attempt to give an experimental basis to the hypothesis of Bayer and Berthelot regarding the steps in the synthesis of sugar. Reactions were secured for the following substances in leaves during assimilation: acetylmethylcarbinol, hydrocyanic acid, glycolic aldehyde, and lactic aldehyde.—*Mrs. W. K. Farr.*

2152. WURMSER, RENÉ, ET MME. J. DUCLAUX. *Sur la photosynthèse chez les algues Floridées.* [On the photosynthesis in red algae.] *Compt. Rend. Acad. Sci. Paris* 171: 1231–1233. 1920.—*Chondrus crispus* and *Rhodymenia palmata* were studied in a comparison of the rate of photosynthesis in green and red specimens of the same species. It was found that the red individuals are photosynthetically more active with a given amount of light. An analysis shows that the red individuals contain more chlorophyll than the green, while the lipochromes (xanthophyll and carotin) are present in about equal amounts.—*C. H. Farr.*

METABOLISM (GENERAL)

2153. ANONYMOUS. [Rev. of: ONSLOW, M. W. *Practical plant biochemistry.* iii + 178 p. Cambridge Univ. Press: Cambridge 1920 (see Bot. Absts. 8, Entry 602).] *Sci. Prog.* [London] 15: 498–499. 1921.

2154. ANONYMOUS. [Rev. of: RIDEAL, S., AND ASSOCIATES. *The carbohydrates and alcohol.* xv + 216 p., 11 fig. Baillière, Tindall & Cox: London, 1920.] *Sci. Prog.* [London] 15: 493–494. 1921.

2155. BAKER, J. L., AND H. F. E. HALTON. *The iodimetric estimation of sugars.* *Biochem. Jour.* 14: 754–756. 1920.—In general, the writers concur with JUDD (see Bot. Absts. 7, Entry 1312) in her favorable report of the WILSTÄTTER and SCHÜDEL iodimetric sugar method and suggest certain modifications in technique.—*A. R. Davis.*

2156. COURTONNE, H. *De l'action contraire des chlorures et des sulfates solubles sur les matières amylacées.* [On the opposite action of soluble chlorides and sulphates on starchy substances.] *Compt. Rend. Acad. Sci. Paris* 171: 1168–1170. 1920.—Chlorides change starch into amylopectin at ordinary temperatures and into soluble starch at 115°C. No swelling of starch occurred at 115°C. in a mixture of 65 parts MgSO₄, 40 parts of water, and 30 parts of starch.—*C. H. Farr.*

2157. COWARD, KATHERINE HOPE, AND JACK CECIL DRUMMOND. *Researches on the fat-soluble accessory substance. IV. Nuts as a source of vitamin A.* *Biochem. Jour.* 14: 665–667. 1920.—This investigation concerns a rat-feeding experiment in which Brazil, Barcelona, pea, walnut, almond, and butternuts were supplied as a source of vitamin A. These, although rich in fats, have low vitamin A values. This is additional evidence according to

the authors supporting the theory that vitamin A is formed in green tissues and not, in appreciable quantities at least, in seed and other resting tissues.—*A. R. Davis.*

2158. DELF, E. MARION. The distribution of accessory food factors (vitamines) in plants. *South African Jour. Sci.* 17: 121-125. 1920.—The accessory food factors or vitamins are widely distributed in the plant world and are associated with definite organs in the plant body. Seeds possess the water soluble and anti-neuritic accessory factor, but less abundantly than animal eggs. Green leaves possess both anti-scorbutic and fat-soluble vitamins in considerable amounts; the etiolated leaves of the white "heart" of a cabbage possess anti-scorbutic but no growth promoting qualities. Storage organs other than seeds contain chiefly the anti-scorbutic accessory factor. Succulent fruits contain the anti-scorbutic vitamin even before ripening is complete, and germinating seeds have considerable anti-scorbutic value even before the appearance of green leaves. Vitamins may thus be produced either in connection with photosynthesis or in connection with the deposition of reserves.—*E. M. Doidge.*

2159. DRUMMOND, JACK CECIL, AND KATHERINE HOPE COWARD. Researches on the fat-soluble-accessory substance. V. The nutritive value of animal and vegetable oils and fats considered in relation to their colour. *Biochem. Jour.* 14: 668-677. 1920.—The writers conclude that unless the existence of a leuco form is assumed, it does not appear probable that the fat-soluble vitamin belongs to the lipochrome pigment group, and the frequently observed association of the growth factor with such pigments must be regarded as accidental. As a class, animal fats possess greater growth-activating power than vegetable oils; but exceptions exist, and no hard and fast line can be drawn.—*A. R. Davis.*

2160. DRUMMOND, JACK CECIL, AND KATHERINE HOPE COWARD. Researches on the fat-soluble accessory factor (vitamin A). VI. Effect of heat and oxygen on the nutritive value of butter. *Biochem. Jour.* 14: 734-739. *Fig. 1-3.* 1920.—The results obtained are in accord with those reported by Hopkins (see *Bot. Absts.* 8, Entry 2191).—*A. R. Davis.*

2161. SCHERTZ, F. M. A chemical analysis of Sudan grass seed. *Bot. Gaz.* 69: 72-82. *1 fig.* 1920.—This paper reports an analysis of unhulled dry seeds, seeds after germination, and a microchemical analysis of the different parts of the seed. The results are given in tables, and comparison is made with analyses of other economic grasses.—*H. C. Cowles.*

2162. STEPHENSON, MARJORY. A note on the determination of the yellow plant pigments from the fat-soluble vitamin. *Biochem. Jour.* 14: 715-720. 1920.

2163. WAKEMAN, NELLIE A. Pigments of flowering plants. *Trans. Wisconsin Acad.* 19: 767-912. 1919 [1920].—The introductory chapter treats briefly of the theories of color in organic compounds, approaching them from the general point of view of absorption spectra. This is followed by an arrangement of the best known plant pigments according to a rational scheme of classification, that is, according to the degree of saturation based upon the underlying hydrocarbon. By means of this arrangement certain relationships, not otherwise easily observable, are emphasized, namely: (1) The influence of unsaturation in the molecule upon the production of color, (2) the influence of so-called chromophorous groups, (3) the existence of homologous series of plant pigments, and (4) the existence of series of pigments related to similar symmetrical, or almost symmetrical, hydrocarbons of different degrees of saturation.—*Nellie A. Wakeman.*

2164. WILLAMAN, J. J. Carbohydrate economy of cacti. [Rev. of: SPOEHR, H. A. The carbohydrate economy of the cacti. *Carnegie Inst. Washington Publ.* 287. 79 p. 1919 (see *Bot. Absts.* 3, Entry 1744).] *Bot. Gaz.* 69: 91-92. 1920.—This contribution is regarded as containing the most complete analysis of the carbohydrates of a single plant tissue that has been obtained.—*H. C. Cowles.*

2165. WILLAMAN, J. J. Plant mucilage. [Rev. of: LLOYD, F. E. Origin and nature of the mucilage in the cacti and in certain other plants. Amer. Jour. Bot. 6: 156-166. 1919 (see Bot. Absts. 3, Entry 442).] Bot. Gaz. 69: 96. 1920.

2166. ZILVA, SYLVESTER SOLOMON. The action of ozone on the fat-soluble factor in fats. Biochem. Jour. 14: 740-741. 1920.—The results show that ozone produces a more destructive effect upon the fat-soluble factors than was true with the aeration experiments of DRUMMOND and COWARD (see Bot. Absts. 8, Entry 2160) and HOPKINS (see Bot. Absts. 8, Entry 2191).—A. R. Davis.

METABOLISM (NITROGEN RELATIONS)

2167. BLUNCK, GUSTAR. Die Anpassung der Knöllchen-Bakterien an Nichtleguminosen. [The adaptation of nodule bacteria to non-leguminous plants.] Centralbl. Bakt. II Abt. 51: 87-90. 1920.—This is a preliminary report. The bacteria must first be adapted to overcome the external mechanical hindrances as well as the inhibiting ferments encountered after entering the plants. The bacteria were first grown on boiled root extract, or root-extract gelatine, the concentration of the extract being gradually increased. After adaptation to the root extract the organisms are grown on dead roots, but must still adapt themselves to the protective plant enzymes by increasing their own antibodies. Active root extract is prepared by grinding the clean, macerated plant roots into a paste by means of quartz sand. The extract is filtered through a Berkefeld filter into sterile containers. This extract is used in increasing amounts with gelatine as with the boiled extract. The medium is sterilized at 50°C. for 1 hour on each of 8 days. When gradually adapted to the activated, organized medium the bacteria are inoculated into living plants. The plants are brought into a state of hunger by culturing in quartz sand and watering with distilled water. The sap flow is lessened by diminishing heat and light.—Anthony Berg.

2168. BUCKNER, G. D., A. M. PETER, AND E. J. KENNEY. The concentration of sodium nitrate tolerated by tobacco plants. Soil Sci. 10: 487-491. 1920.—Wilted or unwilted tobacco plants about 10 inches long were placed in tap water containing varying quantities of NaNO_3 . Solutions containing more than 1 part of NaNO_3 to 3750 parts of tap water cause wilting. Concentrations of 150 parts of NaNO_3 to 3750 parts of tap water cause wilting which is more or less permanent. Solutions containing 2-3 parts of NaNO_3 to 3750 parts of tap water give the best general development.—W. J. Robbins.

2169. FEARON, WILLIAM ROBERT. A study of some bio-chemical tests. No. 2. The Ad-amkiewicz protein reaction. The mechanism of the Hopkins Cole test for tryptophane. A new color test for glyoxylic acid. Biochem. Jour. 14: 548-564. 1920.

2170. GERICKE, W. F. On the protein content of wheat. Science 52: 446. 1920.—Wheat of the Pacific coast states is conspicuously low in protein, due, it is commonly believed, to peculiar influences of climate. The author has investigated the effect of applications of NaNO_3 and $(\text{NH}_4)_2\text{SO}_4$ to plants at different growth periods. Glazed stone jars were filled with a soil low in nitrogen and planted with a pure strain of White Australian wheat. There were added 250 mg. of nitrogen per jar, that is, at the rate of 100 pounds per acre to different jars at different times during the growing period of the plants. A table shows a decided increase (about 77 per cent) in the protein content of wheat obtained from plants receiving nitrogen when 110 days old, over those treated with nitrogen at the time of planting. For each of the different applications of nitrate made after the time of planting there was a corresponding increase in the protein content of the wheat. It is concluded that the low protein content of Pacific Coast wheat is not due primarily to the climate, but to insufficiency of available nitrogen at certain growth periods of the plant.—A. H. Chivers.

2171. NOLTE, O. Düngungsversuche mit Harn. Über Reizwirkung von Kupfer- u. Quecksilberverbindungen. [Fertilizer tests with urine with special reference to the stimulating effect

of compounds of copper and mercury.] Fühling's Landw. Zeitg. 69: 141-144. 1920.—This is a report of progress in an investigation of the effect of additions of copper and a combination of copper and mercury to urine upon the growth of mustard. A substantial increase is found in the efficiency of the urine with the addition indicated over the untreated urine.—A. T. Wiancko.

2172. SCHMIDT, ERNST WILLY. Notiz über das Vorkommen von Volutin bei *Azotobacter chroococcum*. [Notes on the occurrence of volutin in *Azotobacter chroococcum*.] Centralbl. Bakt. II Abt. 50: 44-45. 1920.—The author confirms the former work of FISCHER that volutin occurs in the older cells of *Azotobacter chroococcum* and refutes the work of PRAZMOWSKI, which did not confirm Fischer's results.—Anthony Berg.

2173. WANN, FRANK B. The fixation of free nitrogen by green plants. Amer. Jour. Bot. 8: 1-29. 1 pl., 1 fig. 1921.—Seven species of Chlorophyceae were grown in pure cultures on mineral nutrient agar for periods of from 165 to 297 days. Nitrogen was supplied in the form of nitrates in some cases and in the form of urea, glycocoll, asparagine, and ammonium sulphate in others. Some cultures were supplied with glucose and others were not. Analyses for total nitrogen in the culture media were made at the end of the experiment.—When nitrates were used as a source of nitrogen, and when glucose was also present, all the species showed ability to fix the free nitrogen of the atmosphere, the amounts of fixation representing increases in the total nitrogen content of the culture flasks of from 4 to 54 per cent. A comparison of these results with those reported by other workers for legume bacteria and *Azotobacter* shows that the algae fix fully as much nitrogen per unit volume of medium as do these bacteria.—Five species were grown in the presence of nitrates but without glucose. A very slight increase in the nitrogen content was found in these cases, and the author believes that some fixation took place here. He suggests that the very poor growth made in such cultures may explain the small amount of fixation.—When nitrogenous compounds other than nitrates were supplied as a source of nitrogen, no fixation whatever was obtained, either in the presence or absence of glucose. One case of apparent denitrification is reported.—E. W. Sinnott.

2174. WHITING, ALBERT L., AND WARREN R. SCHOONOVER. Nitrogen fixation by cowpeas and nodule bacteria. Soil Sci. 10: 411-420. 1920.—Analyses were made of inoculated and uninoculated cowpeas planted in nitrogen-free sand and furnished with nitrogen-free mineral salts and water. A comparison of the nitrogen content of the inoculated plants with that of the seeds or uninoculated plants shows that a marked fixation of nitrogen occurs shortly after the formation of the first true leaf. This in 3 experiments was 19 days after planting. The first appearance of nitrogen fixation was 9 days after planting. At the end of 26 days after planting the nitrogen fixed was 3 times that contained in the original seed. Tests with diphenylamine and brucine, with α -naphthylamine sulphanilic acid, and with Nessler's solution failed to show nitrate, nitrite, or ammonia in the inoculated seedlings. Inorganic nitrogen of these forms is not concerned in symbiotic fixation by legumes and nodule bacteria.—W. J. Robbins.

METABOLISM (ENZYMES, FERMENTATION)

2175. BOKORNY, TH. Hefeernährung und Gärung. Gibt es eine Hefeentwicklung ohne Zuckervergärung? [Yeast nutrition and fermentation. Can growth of yeast take place without fermentation of sugar?] Centralbl. Bakt. II Abt. 50: 23-33. 1920.—The rôle of alcoholic fermentation in the life of the yeast plant is discussed. Alcoholic fermentation is not essential, and the yeast plant can grow in the absence of fermentable sugar; fermentation occurs, however, whenever possible, and serves to render the medium unsuitable for the development of competing microorganisms.—M. A. Raines.

2176. BORKOWSKI, R. Beitrag zur Kenntnis des Oxydations-vermögens der Wurzeln der höheren Pflanzen. [The oxidizing powers of the roots of higher plants.] Landw. Versuchssta.

94: 265-284. 1919.—Experiments on various species of plants with .05 and .01 per cent solutions of ammonium-ferrosulphate showed that the roots possess considerable powers of oxidizing the iron. It was found that the oxidizing ability is localized in the regions of the root hairs and at the growing tips. Within the root tissues, the separation of iron takes place in the central cylinder and especially in the wood bundles on the inner walls of the vessels and in the adjoining hadrome parenchyma cells; also in the interior of the tissues of the root tip. Considerable differences were found in the oxidizing ability of the different plants tested, according to the extent of their root systems. The weakest in this respect was *Sinapis* and the highest *Phaseolus*, with *Triticum*, *Cannabis*, *Lupinus*, and *Pisum* ranging between, in the order named. *Triticum*, and to a certain extent *Sinapis* and *Cannabis*, showed their highest oxidizing ability in the earlier stages of growth, while *Phaseolus*, *Pisum*, and *Lupinus* showed their greatest oxidizing ability in the later stages of growth. The oxidizing capacity of roots is related in a practical way to the oxidation processes in the soil.—A. T. Wiancko.

2177. KOPELOFF, NICHOLAS. The prevention of sugar deterioration by the use of superheated steam in centrifugals. Louisiana Planter and Sugar Manufacturer 65: 189-190. Fig. 1. 1920.—By using superheated steam in the centrifugals to wash the sugar, 92-99.5 per cent of the bacteria and mold spores are killed. This improves the keeping quality of both the sugar and the molasses.—C. W. Edgerton.

2178. LAUPPER, G. Die neuesten Ergebnisse der Heubrandesforschung. [Results of recent investigations on the heating of hay.] Landw. Jahrb. Schweiz 1920: 1-54. Fig. 1-5. 1920.—This gives a detailed account of the physiological changes occurring in the heating of hay in the stack. Citations (65) of the literature are appended.—J. D. Luckett.

2179. McDOWALL, R. J. S. A review of recent work on enzyme action. Sci. Prog. [London] 15: 406-434. 1921.—A review of the more recent literature dealing with the nature and action of enzymes is given. The work done in the various phases of this subject is correlated, and from the indications of recent work there are pointed out the lines along which solutions of many of the problems may be found.—J. L. Weimer.

2180. ONSLOW, MURIEL WHELDALE. Oxydizing enzymes. II. The nature of the enzymes associated with certain direct oxidizing systems in plants. Biochem. Jour. 14: 535-540. 1920.—This paper deals with the relation of a substance with catechol grouping to the oxidase system. Solutions of various substances having this grouping, such as catechol, caffeic acid, protocatechuic acid, adrenaline, etc., were found to oxidize slowly in air with the formation of peroxides. A solution of peroxidase added to such peroxides completes an oxidase system, which will blue guaiacum. The autoxidation noted above as concerns catechol, protocatechuic acid, and caffeic acid is accelerated by enzyme extracts of plants which turn brown on injury and the juices of which blue guaiacum without the addition of H_2O_2 . In a previous communication, such plants were shown to contain a compound with the "catechol" grouping and the writer suggests here that they may contain, in addition, a second enzyme, for which she tentatively adopts Bach and Chodat's term, "oxygenase." The function of the latter is to catalyse the autoxidation of the catechol compound with the formation of a peroxide. In the case under discussion, 3 components are considered as making up the oxidase system,—a catechol compound from which a peroxide can be formed, and 2 enzymes, an oxygenase which catalyses the production of a peroxide, and a peroxidase which decomposes the peroxide with the formation of active oxygen. All 3 components are necessary for the bluing of guaiacum.—A. R. Davis.

2181. ONSLOW, MURIEL WHELDALE. Oxidizing enzymes. III. The oxidizing enzymes of some common fruits. Biochem. Jour. 14: 541-547. 1920.—Enzyme action in plant tissue may be difficult of demonstration due to the presence of certain inhibitors as well as to faulty technique. Best results are usually obtained when the tissue is placed directly in the reagent. When tissue extracts are employed action may be modified by (1) failure to extract the enzyme

and (2) the relative concentration of enzymes, sugars, organic acids, and tannins in extracts being different from that existing *in situ*. If inhibitors are present, they must be removed. The following technique was employed by the author: (a) *Reaction of tissues*. Pieces of tissue were placed directly in the reagents,—alcoholic solution of guaiacum, 1 per cent solution benzidine in 50 per cent alcohol with H_2O_2 , 1 per cent α -naphthol in 50 per cent alcohol with H_2O_2 . (b) *Reaction of water extract*. Water extract of pounded tissue was tested in above reagents, and if acid it was neutralized to litmus. (c) *Reaction with extracts of enzymes*. Sugars, tannins, etc., were extracted from pounded tissue with 96 per cent alcohol and the enzyme extracted from the residue with water. This was tested for peroxidase with guaiacum and H_2O_2 , and for oxygenase with catechol and guaiacum. (d) *Extraction of aromatic compounds and their reaction with enzyme extract*. Employing methods outlined above, the following fruits were tested for oxidizing enzymes: Apple, quince, pear, plum, banana, orange, lemon, lime, and raspberry. The apple, pear, quince, and plum were found to contain an oxidase (peroxidase, oxygenase, and aromatic substance with catechol grouping). Both skin and flesh of banana contained peroxidase and oxygenase; the orange, lemon, and lime contained peroxidase in rind and pulp, but no oxygenase and no substance giving the catechol reaction. Raspberry fruit gave similar results.—A. R. Davis.

METABOLISM (RESPIRATION, AERATION)

2182. BERGMAN, H. F. The effect of cloudiness on the oxygen content of water and its significance in cranberry culture. Amer. Jour. Bot. 8: 50–58. 3 fig. 1921.—A study of the oxygen and CO_2 content of pond and bog water used in flooding cranberry bogs was made in Wisconsin and Massachusetts. In general, it was found that oxygen was more abundant and CO_2 less abundant (1) during the latter part of the day as compared with the morning, and (2) during clear days as contrasted with cloudy ones. Under the following conditions, namely, (1) clear, sandy bottom pond, (2) muck-bottom pond, and (3) discolored water of a bog ditch, there were, in the order given, more oxygen and less CO_2 and much less variation in the content of these 2 gases. It is suggested that the photosynthesis and respiration of plants and the oxidation of organic matter are responsible for the amount of these gases present and that differences in light intensity, amount of vegetation, and amount of organic matter produce the differences observed. Experiments are cited in which cranberry plants, submerged in tubs of either pond or ditch water, were injured by shading, while unshaded plants under otherwise similar conditions were not injured. The oxygen content in the unshaded tubs was much reduced. Respiration (and thus the need of oxygen) was found to be much more rapid in flowers and growing tips of cranberry plants than in old shoots. The injury to growing tips which frequently follows flooding the bogs is thought to be due to deficiency of oxygen in the water. Such injuries are more likely to occur if water full of organic matter is used or if flooding is done in cloudy weather.—E. W. Sinnott.

2183. PIÉDALLU, ANDRÉ, PHILIPPE MALVEZIN, ET LUCIEN GRANDCHAMP. Action de l'oxygène sur les moûts de raisins rouges. [The effect of oxygen on the wine from red grapes.] Compt. Rend. Acad. Sci. Paris 171: 1230–1231. 1920.—Oxygen is found to change the color of the solution to a white or a rose if allowed to diffuse through a porous plate, thus no decolorizing chemicals are necessary.—C. H. Farr.

ORGANISM AS A WHOLE

2184. LIESEGANG, RAPHAEL ED. Gegenseitige Wachstumshemmung bei Pilzkulturen. [Mutual antagonism in fungus cultures.] Centralbl. Bakt. II Abt. 51: 85–86. Fig. 1. 1920.—The author attributes the gaps that appear between approaching colonies in the well-known phenomenon of "growth antagonism," to a deficiency of an essential nutrient. This nutrient, which must be essential for both approaching colonies, has diffused in the direction of the growing colonies and no longer exists in sufficient amount to sustain growth. The author has reproduced an analogous phenomenon by using silver nitrate gelatine upon which drops of sodium chloride are placed.—Anthony Berg.

2185. PRINGSHEIM, E. G. Über die gegenseitige Schädigung und Förderung von Bakterien. [The mutual injury and stimulus between bacteria.] *Centralbl. Bakt.* II Abt. 51: 72-85. 1920.—Methods are suggested for the study of the effects of 2 cultures of bacteria growing together. *Bacillus mesentericus vulgatus* on the same plate with *B. diphtheriae* inhibits the growth of the latter, so that even 8-10 colonies of the former will repress entirely the growth of *B. diphtheriae*. In addition to the injurious action *B. mesentericus vulgatus* also exerts a stimulating action on *B. diphtheriae* as indicated by the formation of giant colonies of *B. diphtheriae* in the zone of influence of the former. The substance produced by *B. mesentericus vulgatus* is a thermolabile poison which stimulates in small doses and injures in large ones. Other spore formers of the hay bacillus group, 8 of which were tested, did not exert the same antagonistic action. *B. coli* and *B. paratyphosus* A were not affected by *B. mesentericus vulgatus*. The action of various bacteria on *B. influenzae*, on the gonococcus, and on certain anaerobes was also studied.—Anthony Berg.

2186. ROCKWELL, G. E., AND C. F. MCKHANN. The growth of the gonococcus in various gaseous environments. *Jour. Infect. Diseases* 28: 249-258. 1921.—This is a study of the growth of *Gonococcus* under the influence of hydrogen, oxygen, and carbon dioxide. It is suggested that the fact that bacteria are aerobic, partial tension, anaerobic, or facultative in their respiratory requirements is an expression of their previous gaseous adaptation.—Selman A. Waksman.

GROWTH, DEVELOPMENT, REPRODUCTION

2187. CROCKER, WILLIAM. Germination. [Rev. of: RUSSELL, G. A. Effect of removing the pulp from camphor seed on germination and the subsequent growth of the seedling. *Jour. Agric. Res.* 17: 223-238. 1919 (see Bot. Absts. 3, Entry 2900).] *Bot. Gaz.* 69: 96. 1920.

2188. GOERTZ, OTTO. Untersuchungen über die Haustorienbildung bei *Cuscuta*. [Studies on haustorium formation in *Cuscuta*.] *Centralbl. Bakt.* II Abt. 51: 287-313. 1920.—Experiments are described checking and extending our knowledge of the irritability factors involved in the production of haustoria by *Cuscuta*. The form worked with was *C. Gronovii* Willd., an American species found parasitizing *Impatiens parviflora* DC. in the botanic garden at Leipzig. Haustoria can be produced on any aspect of the surface of the shoot, although the inner or concave side seems to exhibit a higher predisposition in this respect; production of haustoria on the convex or outer face of the stem was induced by allowing the latter to twine within a glass tube. The dodder shoot must be actively growing. Mere contact with a solid body, without a certain amount of pressure, is not sufficient to cause the production of haustoria, as was indicated by attaching sand grains to the shoot by means of paraffine oil. No haustoria are produced after flowering begins. Both twining and haustorium production are inhibited on the klinostat. Contact with liquids will not induce haustorium production though submerged plants may produce haustoria. A dodder plant lived 14 days under water twining around and parasitizing a shoot of *Myriophyllum*. Exposure to radium emanations inhibited all growth activity.—M. A. Raines.

2189. KRAUS, E. J. The modification of vegetative and reproductive functions under some varying conditions of metabolism. *Amer. Jour. Bot.* 7: 409-416. 1920.—The author discusses certain factors which tend to cause a development of vegetative organs in the plant and others which stimulate reproduction. The early idea that the 2 functions are antagonistic and that nitrogen stimulates only the former and potash and phosphorus the latter is now recognized as incomplete. These 2 functions now seem instead to depend upon the relationship between available nitrogen and the plant's supply of carbohydrates. If the former is abundant and the latter scanty (as in plants with reduced leaf surface or growing in poor light) the result is a plant vegetatively weak and with few or no reproductive organs. If both nitrogen and carbohydrates are abundant, however, there is vigorous vegetative development but little sexual reproduction. If nitrogen is limited in relation to carbohydrates, the latter will not

all be used in vegetative extension and can accumulate, with the result that the plant is vigorous and fruitful. Finally, if nitrogen is still further reduced, carbohydrate reserves accumulate in abundance but the plant is weak vegetatively and reproduces but little. The rôle of other chemical elements and of water, light, temperature, and hereditary factors in this problem are also doubtless important and should be thoroughly studied. The author points out the importance in such a problem as this of obtaining a large body of chemical analyses of the plants to be studied, made upon the various tissues and organs and at successive intervals during the year.—*E. W. Sinnott.*

TEMPERATURE RELATIONS

2190. GERICKE, W. F. Influence of temperature on the relations between nutrient salt proportions and the early growth of wheat. *Amer. Jour. Bot.* 8: 59–62. 1921.—Wheat seedlings were grown in the 126 3-salt solutions described by the committee on salt requirements, and at 2 different temperatures, 28°C. (approximately the optimum) and 17°C. (considerably below the optimum). It was found that the best growth at the lower temperature was produced when the proportion of potassium was high and of H_2PO_4 low; and at the high temperature when the proportion of potassium was low and of H_2PO_4 high. Temperature is thus important as a factor in determining what are the mineral requirements for good germination and initial growth in wheat.—*E. W. Sinnott.*

2191. HOPKINS, FREDERICK GOWLAND. The effects of heat and aeration upon the fat-soluble vitamine. *Biochem. Jour.* 14: 725–733. *Fig. 1–4.* 1920.—The experiments conducted show that although fat-soluble A of butter displays considerable resistance to heat alone at temperatures up to 120°C., it is readily destroyed by simultaneous aeration of the fat.—*A. R. Davis.*

2192. JÖRGENSEN, I., AND WALTER STILES. Some scientific aspects of cold storage. *Sci. Prog. [London]* 13: 614–620. 1919.—The authors outline some of the problems involved in studying the cold storage of foods. Some changes which take place in stored fruits are discussed.—*J. L. Weimer.*

2193. WINGE, Ö. A practical form of thermostat aquaria heated by electricity. *Compt. Rend. Trav. Carlsberg Lab. [København]* 14¹⁰: 1–4. 1920.—This form of thermostat aquarium has been in successful use at this laboratory for several years and has been of value in giving aquatic organisms homogeneous conditions and in studying the effect of different degrees of temperature on their activity. Heating units are placed underneath the tank and these are insulated from the air. A mercury contact thermo-regulator operates a switch in the heating circuit by means of a relay. The essential feature of this switch is a sealed glass tube containing 2 drops of mercury connected electrically by the armature of the relay which floats upon them; when the armature is raised contact is broken. An automatically operating air chamber for ventilation is provided.—*F. Weiss.*

2194. ZIKES, HEINRICH. Über den Einfluss der Temperatur auf verschiedene Functionen der Hefe. [The influence of temperature on various functions of yeasts.] *Centralbl. Bakt.* II Abt. 50: 385–410. *Fig. 5.* 1920.—The budding activity of yeasts is more or less dependent on those temperatures at which it was previously grown and to which it has adapted itself. "Cold" yeasts, that is, yeasts formerly grown at low temperatures, show a much more rapid growth (likewise more rapid ascospore formation) at all low temperatures than do cells of the same species grown at a higher temperature, and conversely. Some yeasts are more irritable in this respect than others. Cold yeasts adapt themselves more easily to higher temperatures than high temperature yeasts to lower temperatures. The formation of fat (in the fat granules) takes place very slowly at low temperatures (12–15°C.) and more rapidly at high temperatures (20–30°C.). A secondary development of small fat globules occurs very abundantly at low temperatures. *Mycoderma cerevisiae* is a weak glycogen former; likewise *Torula alba* and *Willa Anomaia*. In *Chalara mycoderma* variations in temperature

seem to have little influence on the formation of glycogen. The optimum for the formation of glycogen in brewer's yeast is around 30°C. Cells kept at high temperatures for some time and then forced to adapt themselves to low temperatures showed a very low rate of propagation (20-30 cells in 3 days) while yeasts of the same species grown at high temperatures for some time produced 300,000-350,000 cells in the same period. The formation of esters is slower at lower temperatures (10°C.) than at higher temperatures (30°C.). The shape of the cells is influenced by variations in temperature; the former shapes being assumed, however, when subsequently grown at optimum temperatures. In pigment producers the production of coloring matter is most pronounced at low temperatures. Giant colonies show only gradual changes with variations in temperature, but are raised above the substratum much more when grown at low temperatures. Softening and liquefaction of yeasts takes place more rapidly as the temperature increases. In determinations of the thermal death point *Willa saturnus*, *Schizosaccharomyces Pombe*, *Saccharomyces Logos*, and *Saccharomyces thermantitonum* were found more resistant.—*Anthony Berg.*

RADIANT ENERGY RELATIONS

2195. RUSS, SIDNEY. Growth and division of cells as affected by radiation. *Sci. Prog.* [London] 13: 605-613. 1919.—This is a discussion of the effect of x-rays on the growth of tumors, with special reference to the susceptibility of the cells in different stages of growth to radiation.—*J. L. Weimer.*

TOXIC AGENTS

2196. HARDEN, ARTHUR, AND FRANCIS ROBERT HENLY. The effect of pyruvates, aldehydes, and methylene blue on the fermentation of glucose by yeast juice and zymin in presence of phosphate. *Biochem. Jour.* 14: 642-653. *Fig. 1-2.* 1920.—The investigators take as a thesis the fact noted by various workers that α -ketoacids and aldehydes have an activating effect upon yeast fermentation, particularly at the commencement of the reaction, and that this effect has been noted especially in experiments made with maceration extract containing a large amount of mineral phosphate. The question arose as to whether this was a general stimulation effect or a more specialized acceleration of the reaction in the presence of free mineral phosphate. In general, the results show no marked activation following the addition of aldehydes to fermenting mixtures of yeast juice or zymin with glucose. If a suitable amount of phosphate be added, the effect of the aldehyde is to greatly diminish the time required for the maximum gas production, and likewise a higher maximum is attained. On completion of the esterification of the phosphate, the rate again diminishes both in the presence and absence of aldehyde and the total evolution is not greatly different in the 2 cases. Similar effects were obtained with pyruvates. The effect varies with the concentration of the aldehyde and is common to, but not equal in, the 4 aldehydes tested, formic, acetic, propionic, and butyric. The results suggested an effect due to a lack of an acceptor for hydrogen. Methylene blue, readily reducible by hydrogen, produced the same effects as the aldehydes. In the light of these results, the final stage of alcoholic fermentation of sugar is held to be the reduction of the acetaldehyde produced by the decomposition of pyruvic acid, the production of this latter from sugar being only possible when some acceptor for hydrogen is available. This acceptor is normally supplied by acetaldehyde produced at a later stage of the reaction.—*A. R. Davis.*

2197. WILLAMAN, J. J. Toxicity of alpha-crotonic acid. [Rev. of: SKINNER, J. J., AND F. R. REED. The influence of phosphates on the action of alpha-crotonic acid on plants. *Amer. Jour. Bot.* 6: 167-180. 1919 (see *Bot. Absts.* 3, Entry 437).] *Bot. Gaz.* 69: 96. 1920.

MISCELLANEOUS

2198. CARLES, PIERRE. Sur la casse bleue des vins. [The "blue cassia" of wine.] *Compt. Rend. Acad. Sci. Paris* 169: 1422-1423. 1919.—The treatment of this so-called "disease" of wine by the addition of an organic acid, either tartaric or citric, is recommended.—*R. W. Webb.*

trichum commune L. [Spore dissemination in *Polytrichum commune* artificially induced.] *Hedwigia* 60: 350-351. 1919.—If mature capsules of *Polytrichum commune*, deprived of their opercula, are immersed in ether, the spores are set free through the minute openings between the peristome and the epiphragm. The ether dissolves the layer of wax on the outside of the spore-case, and this is followed by a contraction of the internal parts of the capsule. The extrusion of the spores, which is at first violent and accompanied by a distinct crackling sound, gradually slows down.—A. W. Evans.

2200. PIÉDALLU, ANDRÉ. Sur le rôle du fer dans la casse bleue des vins. [The rôle of iron in "blue cassia" of wine.] *Compt. Rend. Acad. Sci. Paris* 169: 1108-1109. 1919.—The term "casse bleue" is applied to a "disease" of wine, and the author finds that this frequently appears in wine that has been previously transported in wagon-casks made of iron. Among the phenomena accompanying this disease are the deposition of the coloring matter of the wine on the sides and bottom of the containing vessels and the appearance of an iridescent veil on the surface. The indications are that the "disease" is induced by the presence of ferric salts. Control methods are suggested.—R. W. Webb.

2201. VAN ALSTINE, ERNEST. The determination of hydrogen-ion concentration by the colorimetric method and an apparatus for rapid and accurate work. *Soil Sci.* 10: 467-479. *Pl. 1, fig. 1-2*. 1920.—A colorimeter is described consisting of an eyepiece and wooden blocks holding the standard tubes and the unknown solutions which slide before it. The blocks holding the tubes may have 1, 2, or 3 series of holes and tubes, depending upon whether single tube standards, double tube standards, or double tube standards and turbid solutions are used. A graph and table prepared by calculation are given which permit the preparation of double tube standards having any desired P_H between 2 and 10.—W. J. Robbins.

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 1584, 1585, 1586, 1589, 1607, 1614, 1624, 1816, 1958, 1963, 1977, 2150, 2174, 2176, 2190)

2202. ANONYMOUS. [Rev. of: COLLINS, S. H. *Chemical fertilizers and parasiticides*. xii + 273 p., 8 fig. Ballière, Tindall & Cox: London, 1920.] *Sci. Prog.* [London] 15: 494-495. 1921.

2203. ANTONIADIS ET MAUME. Essais avec la cyanamide de calcium. [Experiments with calcium cyanamid.] *Ann. École Nation. Agric. Montpellier* 17: 120-130. *Fig. 1*. 1918 [1919].—Pot culture experiments showed that calcium cyanamid is clearly toxic when incorporated in the soil at the time the grain is sown. When incorporated some time before the seed is sown (at least 15 days) calcium cyanamid loses its toxicity, but the seedlings are inferior to those grown in control plots. A study of the effect of calcium cyanamid on different types of soils is contemplated.—F. F. Halma.

2204. BAGULEY, A. Building up the fertility of the soil. *Jour. Dept. Agric. Union of South Africa* 1: 755-759. 1920.—Improving the productivity of soil by supplying humus, lime, nitrogen, potash and phosphoric acid is discussed and also the common chemicals used in commercial fertilizers.—Lyman Carrier.

2205. BIPPART, E. Zum Wasserhaushalt des Bodens. [Water relations of soils.] *Mitteil. Deutsch. Landw. Ges.* 35: 330-331. 1920.

2206. CROCKER, WILLIAM. Heated soils. [Rev. of: JOHNSON, JAMES. *The influence of heated soils on seed germination and plant growth*. *Soil Sci.* 7: 1-87. 1919 (see Bot. Absts.

3, Entry S54).] *Bot. Gaz.* 69: 94-95. 1920.—This is regarded as “a very critical and exhaustive piece of work.” The “results are valuable in elucidating the effects of sterilizing soils by heat.”—*H. C. Cowles.*

2207. DACKNOWSKI, ALFRED P. Peat deposits in the United States and their classification. *Soil Sci.* 10: 453-465. 1920.—A review of literature dealing with the extent and systems of classifying peat deposits.—*W. J. Robbins.*

2208. FRAPS, G. S. Composition of the soils of Archer, Franklin and Harris counties. *Texas Agric. Exp. Sta. Bull.* 244. 78 p. 1919.—The area of each soil type occurring in the 3 counties is given together with the amount of plant food each contains. Each soil is described and its needs suggested. The results of pot experiments on the various soils are given and methods of maintaining soil fertility discussed.—*L. Pace.*

2209. FRAPS, G. S. The needs of Texas soils for lime. *Texas Agric. Exp. Sta. Bull.* 243. 18 p. 1919.—A general discussion of the effects of lime in which it is pointed out that lime affects the physical character of the soil, aids in the retention of water, and makes phosphoric acid more available. Experiments are cited which show that it does not render potash more available. Lime aids in making the nitrogen content of the soil more available, resulting in more rapid impoverishment of soils. As a rule, lime should not be used on alkali soils as the carbonates formed are more injurious than the alkali. Sources of lime for agricultural uses are discussed and methods of applying are described.—The distribution of acid soils in Texas is given.—*L. Pace.*

2210. HASENBÄUMER, J. Einfluss der Bodenreaktion auf die Düngung und Fruchtbarkeit der Kulturböden. [Influence of the soil reaction on fertilizing and on the productivity of the soil.] *Mitteil. Deutsch. Landw. Ges.* 36: 80. 1921.—The author calls attention to the damage to plants from an acid soil and suggests the following method for determining the relative acidity of soils. Thirty grams of soil are shaken for 1 hour with 100 cc. 7.5 per cent solution of KCl. To 10 cc. of the filtrate 4-5 drops methyl red are added. After violent shaking the color will be lilac if the reaction is very strongly acid, carmine if strongly acid, cinnabar red if acid, orange if weakly acid, and yellow if neutral or alkaline. In the last case 10 cc. of filtrate should be used with 5 drops of Azolium. If the solution becomes pure blue without a trace of violet or red the soil is strongly alkaline.—*A. J. Pieters.*

2211. HERMANN. [REV. OF: LOEW, OSKAR. Ueber die Bedeutung des Kalkes für die Ernährung der Pflanzen, Tiere und Menschen. (The significance of lime in the nourishment of plants, animals, and man.) *Naturwiss. Zeitschr. Forst- u. Landw.* 16: 309. 1918.] *Forst. Rundschau* 20: 27-28. 1919.

2212. JURITZ, CHAS. F. The agricultural soils of the Union. A summary of existing knowledge. *South African Jour. Indust.* 4: 76-84. 1921.

2213. LEACH, B. R. A study of the behavior of carbon disulfide when injected into the soil and its value as a control for the root form of the woolly apple aphid. *Soil Sci.* 10: 421-451. *Pl.* 1-2, fig. 1-8. 1920.—By using buried pieces of roots infected with woolly aphid it was found that the moisture content of the soil limits the effective diffusion of CS₂. It cannot be applied effectively when conditions are favorable for killing the aphid without injuring the roots.—*W. J. Robbins.*

2214. LEMMERMANN, O., UND L. WICHERS. Über den periodischen Einfluss der Jahreszeit auf den Verlauf der Nitrifikation. [Seasonal influence on the rate of nitrification.] *Centralbl. Bakt.* II Abt. 50: 33-43. 1920.—An experiment is described in which parallel analyses for nitrates were made monthly for 12 months of samples of soil from the field, and from a quantity of similar soil kept in the laboratory under constant temperature and moisture conditions. The curves for the 2 series of tests practically coincide, exhibiting maxima in April and July.—*M. A. Raines.*

2215. MARCHAND, B. DE C. **Chemical analysis of soils.** Jour. Dept. Agric. Union of South Africa 1: 341-348. 1920.—The author annotates in detail the information contained in a "complete soil analysis" and in a partial analysis to determine manurial needs.—*E. M. Doidge.*

2216. MARCHAND, B. DE C. **Representative Transvaal soils 1. The Koedoespoort Red Loam.** Jour. Dept. Agric. Union of South Africa 1: 722-727. 1920.

2217. MÜNTER, F. **Die Zuckerrübe als Boden analysatorim.** [The sugar beet as soil analyzer.] Mitteil. Deutsch. Landw. Ges. 35: 313-314. 1920.—The author points out that while a chemical analysis of plants generally does not yield information of value regarding the fertility of the soil, the sugar beet may be used in a limited way to determine whether or not potassium or phosphoric acid is present in the soil in sufficient quantities. From tables of analyses he concludes that if, on soil in which there is ample nitrogen, the percentage of potash in the plant exceeds that of nitrogen, there is sufficient potash in the soil; if it is less, there is not enough for the plants. If, on similar soil, the ratio of nitrogen to phosphoric acid is greater than 100:20, phosphoric acid is needed; if the ratio is less, phosphoric acid is present in sufficient quantity.—*A. J. Pieters.*

2218. SMIT, B. J. **Representative Transvaal soils, II. Pretoria quartzite sandy soils.** Jour. Dept. Agric. Union of South Africa 2: 170-176. 1921.

2219. STEAD, ARTHUR. **The agriculture and soils of the Cape Province, 1.** Jour. Dept. Agric. Union of South Africa 1: 152-158. *Pl. 1-2, map.* 1920.—An account is given of the Witkop district in the Stormburgen, with reference to its climatic conditions, potato and wheat culture, and principal types of soils.—*E. M. Doidge.*

2220. STEAD, ARTHUR. **The agriculture and soils of the Cape Province IV. Witkop Burghersdorp.** Jour. Dept. Agric. Union of South Africa 1: 660-670. *Pl. 6-7.* 1920.

2221. STEAD, ARTHUR. **The agriculture and soils of the Cape Province V. Witkop-Burghersdorp.** Jour. Dept. Agric. Union of South Africa 1: 819-828. *Pl. 8-10.* 1920.

2222. STEAD, ARTHUR. **Brak in its relation to irrigation.** Jour. Dept. Agric. Union of South Africa 1: 13-25. *Pl. 1-4.* 1920.—Where the rainfall is so light that irrigation is necessary the soil contains more or less brak. Directions are given for the irrigation of brak soils, and for the use of brak waters in irrigation. Crops which are deep rooted and which shade the land are best for brak lands because they prevent evaporation at the surface.—*E. M. Doidge.*

2223. THOMPSON, H. C. **Experiments with muck soils in growing greenhouse crops.** Jour. Amer. Peat Soc. 14: 45-63. 1921.—Lettuce, cauliflower, tomatoes, carnations, and roses were used to test muck as a greenhouse soil. A chemical analysis does not give any indication of the crop-producing capacity of a muck soil.—*G. B. Rigg.*

2224. WEIGNER, GEORG. **Boden und Bodenbildung in kolloidchemischer Betrachtung.** [Soil and soil formation in the light of colloidal chemistry.] 15 x 22 cm., 98 p., 10 fig. Theodor Steinkopff: Dresden and Leipzig. 1918.—A general treatise on the subject, reviewing the late developments in colloidal chemistry and applying the principles of colloidal chemistry to soil formations.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 1604, 1655, 1695, 2006, 2009)

GENERAL

2225. BLACK, J. M. Additions to the flora of South Australia. No. 15. Trans. and Proc. Roy. Soc. South Australia 43: 23-44. Pl. 6-8. 1919.—Three species are included which are believed to be new to science. They are described under the names *Kochia Cannonii*, *Pimelea Williamsonii*, and *Goodenia vernicosa*.—J. H. Faull.

2226. BLACK, J. M. Additions to the flora of South Australia. No. 16. Trans. and Proc. Roy. Soc. South Australia 43: 349-354. Pl. 32. 1919.

2227. CHANCEREL, LUCIEN. Flore forestière du globe. [Forest flora of the world.] 16.5 × 25 cm., 738 p. Gauthier-Villars et Cie.: Paris, 1920.—The avowed purpose of this work is to describe, scientifically and practically, the principal trees of the world and to indicate (1) their botanical and sylvan characteristics, (2) their geographical distribution and habitats, (3) their soil preferences, (4) the different races of each species, (5) the characters and properties of their woods, (6) their various products, (7) their cultural uses, and (8) their diseases and their enemies. The commoner or more generally known trees, shrubs, and vines native to all parts of the world are treated according to the above headings with more or less detail.—E. B. Payson.

2228. COULTER, J. M. Flora of District of Columbia. [Rev. of: HITCHCOCK, A. S., and P. C. STANDLEY. Flora of the District of Columbia and vicinity. Contrib. U. S. Nation. Herb. 21: 1-329. 42 pl. 1919 (see Bot. Absts. 4, Entry 1731).] Bot. Gaz. 68: 487. 1919.

2229. COULTER, J. M. New African plants. [Rev. of: MOORE, SPENCER LeM. Alabastra diversa. XXXI. 1. Miscellaneous Africana. Jour. Botany 57: 212-219, 244-251. 1919 (see Bot. Absts. 3, Entry 3003; 4, Entry 1748).] Bot. Gaz. 68: 488. 1919.

2230. HOLMBOE, JENS. Den botaniske ekskursjon i Bergens shjargaerd efter det 16 de skandinaviske naturforskermöte 17 de og 18 de juli 1916. [The botanical excursion among islands near Bergen after the 16th meeting of the Scandinavian naturalists July 17-18, 1916. Bergens Mus. Aarbok Naturv. Raekke 1917-1918¹⁶: 31 p. 1920.—The contribution includes: Notes on vascular plants, with list; *Taraxacum schizophyllum* Dahlst., n. sp.; and a list of bryophytes and lichens.—A. Gundersen.

2231. HOUSE, HOMER D. Wild flowers of New York. New York State Mus. Mem. 15. 362 p., 264 quadricolor photo pl., 35 fig. 1918 [1920].—The author has presented a treatment of the wild flowers of New York similar in purpose and scope to Fuertes' "Birds of New York," but while the colored plates of the latter were reproduced from original paintings by Fuertes, in the present memoir all illustrations are from photographs, 35 species being shown in black and white half tone and 364 species in natural colors by the quadricolor process. In this process, from black and white photographs taken in the field, "four plates were made to print respectively yellow, red, blue, and black, the latter to give shade and depth to picture. With a lumiere photograph as guide (this having been taken in the field at same time as black and white photos) the other 3 plates were etched down to print each its respective color in the correct proportion and position. These plates set up in press and printed in sequence, yellow, blue, red, black, in perfect register give the quadricolor process picture." Of the 402 species illustrated, nearly all are herbaceous, there being only a few shrubs (*Ericaceae* notably) and no trees. Numerous foreign species now run wild in this territory are included. Eighty-

eight families (following Britton and Brown, 2nd ed., are represented, many by only a single species, but of the order Liliales 26 species are shown, of the orchid family 28 (thus reflecting the popular interest in this group), of the buttercup family 22, and of Rosales as a whole 44 species. The genus *Viola* is fully represented by 17 species while of the order Ericales there are 20, of mints 13, of the Scrophulariaceae 17, and of composites in the broad sense 50 species. Descriptive text accompanies the plates and figures, all being printed on uniform medium weight coated paper. Common names are given in dark faced type followed by the scientific name in italics. A paragraph of technical description, another of habitat relations, geographical distribution, flowering data, and frequency. Frequently also data as to related genera or species are given and, in some cases, items of general information or historical interest are added. Keys to more difficult or larger genera are included; as in *Polygala*, *Viola*, and *Aster*. The text and plates are preceded by 23 pages of descriptions of plant structures for the aid of persons not trained in the use of manuals—a sort of illustrated glossary with 95 cuts adapted from Gray's *Lessons in Botany*.—W. L. Bray.

2232. MOSS, C. E. **The Cambridge British flora.** Vol. 3, *xvi* + 200 p., 191 pl. University Press: Cambridge [England], 1920.—The present volume continues this well known work on the same plan as the previous volumes; it includes the families Portulacaceae to Fumariaceae. Outstanding features of the work are: A very full bibliography and synonymy, outline maps showing the distribution of species, a recognition and differentiation of many varieties, subvarieties, forms, and hybrids, several of which are indicated as new or new combinations.—J. M. Greenman.

2233. RICE, BERTHA M., AND ROLAND RICE. **Popular studies of California wild flowers.** 8 vo., 127 p., 34 illustrations from photographs. Upton Bros. & Delzelle: San Francisco, 1920.—The title of this volume well characterizes the work. The authors have presented in popular more or less poetic style some of the attractive Californian wild flowers.—J. M. Greenman.

2234. STONE, HERBERT. **A guide to the identification of our more useful timbers, being a manual for the use of students of forestry.** 8 vo., *viii* + 52 p., 3 pl. Cambridge University Press: London, 1920.

2235. TAYLOR, NORMAN. [Rev. of: BRITTON, N. L., AND C. F. MILLSPAUGH. **The Bahama Flora.** *viii* + 695 p. Published by the authors: New York, 1920 (see Bot. Absts. 7, Entry 1429).] *Torreya* 20: 124, 125. 1920.

PTERIDOPHYTES

2236. HIERONYMUS, G. **Bemerkungen zur Kenntnis der Gattung *Angiopteris* Hoffm., nebst Beschreibungen neuer Arten und Varietäten derselben.** [The genus *Angiopteris* with descriptions of new species and varieties.] *Hedwigia* 61: 242-285. 1919.—The following new species from the Orient are described: *Angiopteris Naumannii*, *A. novocaledonica*, *A. papandayanensis*, *A. Cumingii*, *A. Henryi*, *A. elongata*, *A. Oldhami*, *A. boninensis*, *A. palauensis*, *A. Boivini*, *A. Fauriei*, *A. fokiensis*, *A. yunnanensis*, *A. caudatiformis*, *A. Sakuraii*, *A. oschimensis*, and *A. oligotheca*. Several new varieties are included.—D. Reddick.

SPERMATOPHYTES

2237. ALLEN, MARION E. **The supposed generic character of *Naumburgia*.** *Rhodora* 22: 193-194. 1920.—By some botanists *Lysimachia thyrsiflora* has been separated from *Lysimachia*, as a genus *Naumburgia*, on the ground of the small, tooth-like staminodia in the sinuses of the corolla. A number of dissections of both American and foreign material in the Gray Herbarium showed that the American specimens were consistently characterized by an absence of staminodia, and that they were wanting in a majority of cases in the Eurasian material. Thus *Naumburgia* Moench, as a genus distinct from *Lysimachia*, falls to the ground. The plant with teeth is probably a variation.—James P. Poole.

2238. BAAS BECKING, L. H. *Staphylea colchica* Stev. var. *laxiflora* n. var. Mededeel. Landbouwhoogeschool Wageningen 17: 83-89. Pl. 6-7. 1920.

2239. BLACK, J. M. A revision of the Australian *Salicornieae*. Trans. and Proc. Roy. Soc. South Australia 43: 355-367. Pl. 33-37. 1919.—Four genera are included in the present revision, namely, *Arthrocnemum*, *Pachycornia*, *Salicornia*, and *Tecticornia*. One new variety, *A. halocnemoides* Nees var. *pergranulatum*, is described; *A. Lylei* (*Salicornia* Ewart & White) and *P. tenuis* (*Salicornia tenuis* Benth.) appear as new combinations.—J. H. Faull.

2240. BRADSHAW, R. V. A new Oregon *Eucephalus*. Torrey 20: 122, 123. 1920.—*Eucephalus vialis* n. sp., collected on rocky hillsides at Eugene, Oregon, is described. The species seems nearest to *E. Engelmannii* (Gray) Greene, from which it differs chiefly in the smaller rayless heads, with narrower and more glandular involucreal bracts.—J. C. Nelson.

2241. BRANDEGEE, TOWNSHEND STITH. *Plantae Mexicanae Purpusianae*, X. Univ. California Publ. Bot. 7: 325-331. Dec 29, 1920.—The author describes 1 new genus and 18 new species. The new genus is *Pachystelma* (gen. nov. Asclepiadacearum). All new species with one exception are named by the author as follows: *Hechtia glabra*, *H. Purpusii*, *Ocotea pyramidata* Blake, *Bauhinia jucunda*, *Indigofera acasonicae*, *Eriosema nigropunctatum*, *Esenbeckia ovata*, *Euphorbia consoquillae*, *Jatropha longepedunculata*, *Ayenia Purpusii*, *Maba Purpusii*, *Sideroxylon campestre*, *Dictyanthus prostratus*, *Polystemma rupestre*, *Pachystelma cordatum*, *Cynanchum racemosum*, *Solanum molestum*, and *Viguiera pauciflora*.—W. A. Setchell.

2242. CHEEL, EDWIN. Notes on three species of *Melaleuca*. Trans. and Proc. Roy. Soc. South Australia 43: 368-372. Pl. 38. 1919.—Critical notes are recorded on *Melaleuca pustulata* Hook f., *M. halmaturorum*, and *M. pauperiflora* F. v. M.—J. H. Faull.

2243. COULTER, J. M. Tropical American plants. [Rev. of: BLAKE, S. F. (1) The genus *Homalium* in America (see Bot. Absts. 5, Entry 2370). (2) New South American spermatophytes collected by H. M. Curran (see Bot. Absts. 5, Entry 2371). Contrib. U. S. Nation. Herb. 20: 221-235, 237-245. 1919.] Bot. Gaz. 68: 488. 1919.

2244. COULTER, J. M. New species of *Vernonia*. [Rev. of: GLEASON, H. A. Taxonomic studies in *Vernonia* and related genera. Bull. Torrey Bot. Club 46: 235-252. 1919 (see Bot. Absts. 5, Entry 2381).] Bot. Gaz. 68: 488. 1919.

2245. COULTER, J. M. New names. [Rev. of: MACBRIDE, J. FRANCIS. (1) Notes on certain Leguminosae. (2) Reclassified or new spermatophytes. Contrib. Gray Herb. Harvard Univ. N. S., 59: 1-27, 28-39. 1919 (see Bot. Absts. 4, Entry 1743).] Bot. Gaz. 68: 488. 1919.

2246. COULTER, J. M. [Rev. of: (1) ROCK, J. F. The arborescent indigenous legumes of Hawaii. Hawaii Bd. Agric. and Forest. Bot. Bull. 5. 53 p., 18 pl. 1919 (see Bot. Absts. 4, Entry 1763). (2) ROCK, J. F. The Hawaiian genus *Kokia*. Hawaii Bd. Agric. and Forest. Bot. Bull. 6. 22 p., 7 pl. 1919 (see Bot. Absts. 4, Entry 1764). (3) KOIZUMI, GENITI. Contributiones ad floram Asiae Orientalis. Bot. Mag. Tôkyô 33: 110-129. 1919 (see Bot. Absts. 4, Entry 1734).] Bot. Gaz. 68: 487. 1919.

2247. COULTER, J. M. New tropical American plants. [Rev. of: STANDLEY, P. C. Studies of tropical American phanerogams. Contrib. U. S. Nation. Herb. 20: 173-220. 1919 (see Bot. Absts. 5, Entry 2398).] Bot. Gaz. 68: 487. 1919.

2248. FERNALD, M. L. Brainerd and Peitersen's Blackberries of New England. [Rev. of: BRAINERD, EZRA, AND A. K. PEITERSEN. Blackberries of New England—their classification. Vermont Agric. Exp. Sta. Bull. 217. June, 1920 (see Bot. Absts. 8, Entry 233).] Rhodora 22: 185-191. 1920.

2249. HALL, HARVEY MONROE. *Chrysanthamnus nauseosus* and its varieties. [Part I of: HALL, H. M., AND THOMAS HARPER GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 159-181. Nov. 7, 1919.—The author undertakes to deal with the botanical relationships of the species of *Chrysanthamnus* concerned. There is given a key to the sections of the genus and then one to the 22 varieties of *Chrysanthamnus nauseosus* (Pall.) Britt. The new varieties and new combinations treated under the species are as follows: var. *hololeucus* (Gray), var. *latisquameus* (Gray), var. *salicifolius* (Rydb.), var. *gnaphalodes* (Greene), var. *speciosus* (Nutt.), var. *frigidus* (Greene), var. *plattensis* (Greene), var. *bernardinus*, var. *Bigelovii* (Gray), var. *glareosus* (M. E. Jones), var. *leiospermus* (Gray), var. *californicus* (Greene), var. *ceruminosus* (Dur. & Hilg.), var. *oreophilus* (A. Nels.), var. *pinifolius* (Greene), var. *consimilis* (Greene), var. *viridulus*, var. *mohavensis* (Greene), and var. *junceus* (Greene).—W. A. Setchell.

2250. JUMELLE, HENRI. Le Katoka, arbre a graines comestibles de Madagascar. [The katoka, a tree of Madagascar bearing edible seeds.] Compt. Rend. Acad. Sci. Paris 171: 924-926. 1920.—The katoka is the seed of a tree of a new species of *Treculia*, named *T. Perrieri* sp. nov. It is related to the jackfruit and breadfruit and is found in western Madagascar. A description of the plant is given.—C. H. Farr.

2251. KRÄNZLIN, FR. Beiträge zur Kenntnis der Gattung *Telipogon* HBK. [Contributions to a knowledge of the genus *Telipogon*.] Ann. Naturhist. Mus. Wien 33: 9-38. 1920.—There is a historical introduction to the account of this orchidaceous genus, a key to the 53 species, followed by descriptions of each. The following are described as new: *T. minutiflorus* (Costa Rica), *T. Sprucei* (Ecuador), *T. christobalensis* (Costa Rica), *T. Endresianum* (Costa Rica), *T. buenavistae* (Costa Rica), *T. buenaventurae* (Colombia), *T. Kalbreyerianus* (Colombia).—A. S. Hitchcock.

2252. MAIDEN, J. H. Notes on Tasmanian Eucalypts. Papers and Proc. Roy. Soc. Tasmania 1918: 82-90. 1919.

2253. RIDLEY, H. N. New Malayan plants. Jour. Botany 58: 147-149, 195-196. 1920.—The genera *Peripetasma* (Menispermaceae) and *Scaphocalyx* (Flacourtiaceae) are described as new, and the following new species are proposed: *Peripetasma polyanthum*, *Tinospora Curtisii*, *Scaphocalyx spathacea*, *S. parviflora*, and *Entada Schefferi*.—K. M. Wiegand.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

2254. ANONYMOUS. Note. [Rev. of: SAUVAGEAU, CAMILLE. Utilisation des algues marines. [Utilization of marine algae.] Encyclopédie Scientifique: Bibliothèque de Botanique Appliquée. vi + 394 p. Octave Doin: Paris, 1920 (see Bot. Absts. 8, Entry 604).] Nature 106: 435. 1920.

2255. BARNARD, J. E. Microscopy with ultra-violet light. Nature 106: 378-381. 5 fig. 1920.—Description of apparatus used by author (essentially same as devised by KOHLER); illustrations of apparatus, photomicrographs of *Saccharomyces Pastorianus* and *Bacillus anthracis* by dark ground illumination compared with that by ultra-violet light.—O. A. Stevens.

2256. COTTERELL, K. W. Production of peat in 1919. Jour. Amer. Peat Soc. 14: 7-14. 1921.—The total production of peat in the United States in 1919 was 69,197 short tons, valued at \$705,532. The products from it were utilized as fertilizer and fertilizer filler, fuel, and as an ingredient of stock food. Carbonized peat is used for the latter purpose and it is not claimed to have "any particular nutritive value."—G. B. Rigg.

2257. CROSSLEY, A. W. **Industrial research associations. III. The British Cotton Industry Research Association.** *Nature* 106: 411-413. 1920.—Organization and outline of investigational work are described.—*O. A. Stevens.*

2258. F., H. B. **The Bulawayo meeting of the South African Association.** *Nature* 106: 388-389. 1920.—A review of the presidential address by I. B. POLE EVANS, "The Veld: its resources and dangers," and briefer notes of other botanical papers are presented.—*O. A. Stevens.*

2259. KAISER, GEORGE B. **Little journeys into mossland. II. A February thaw.** *Bryologist* 24: 5-6. 1921.—This is an informal account of a botanical ramble in search of mosses along Wissahickon Creek, Philadelphia.—*E. B. Chamberlain.*

2260. LAMBERT, F. **La sericulture et les aveugles.** [Silk culture and the blind.] *Ann. École Nation. Agric. Montpellier* 17: 105-119. *Fig. 1-10.* 1918 [1919].—It is shown that the greater part of the work pertaining to silk culture can be satisfactorily performed by blind persons.—*F. F. Halma.*

2261. MILLS, D. GORDON. **The protection of wildflowers.** *Jour. Bot. Soc. South Africa.* 6: 14-16. 1920.

2262. MYERS, J. L., AND H. H. TURNER. **The British Association.** *Nature* 106: 277-279. 1920.—A discussion of the place and management of meetings.—*O. A. Stevens.*

2263. PAMMEL, L. H. **Some economic phases of botany.** *Science* 53: 4-15. 1921.—In his address before Section G of the American Association for the Advancement of Science, Chicago, 1920, the writer reviews the work of earlier investigators and points out its bearing on the problems of the present and the future. The work is reviewed under the following headings: Plant pathology; pollination of flowers; plant breeding; seed studies; grasses; weeds; erosion; and aquatic farming. The plea is presented that botanists should enter more vigorously into the exploration of fields of agronomy, ecology, and taxonomy as they are related to agriculture and horticulture.—*A. H. Chivers.*

2264. STANFORD, R. V. **The British Association.** *Nature* 106: 279-280. 1920.—Discussion of place and management of meetings.—*O. A. Stevens.*

2265. STOELTZER, W. **Ueber Alaunhämatoxylin.** [Concerning alum haematoxylin.] *Centralbl. Allg. Pathol.* 30: 290-291. 1919.—The author describes the chemistry and staining properties of alum haematoxylin.—*E. C. Stakman.*

2266. WATERS, C. E. **The society for the prevention of the wild.** *Amer. Fern Jour.* 10: 115-119. 1920.—The article is a plea for the preservation of wild plants, especially of ferns.—*F. C. Anderson.*

2267. WOODS, A. F. **The future of agricultural science in the American Association for the Advancement of Science.** *Science* 53: 27-29. 1921.—While much has been accomplished in agricultural investigation in the past, what may rightly be termed the scientific phase of agricultural development is just being entered upon. If we are to feed and clothe the increasing population of the world and still retain some time for culture and recreation we shall need to conduct scientific research in all fields to an extent hitherto unknown.—*A. H. Chivers.*

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
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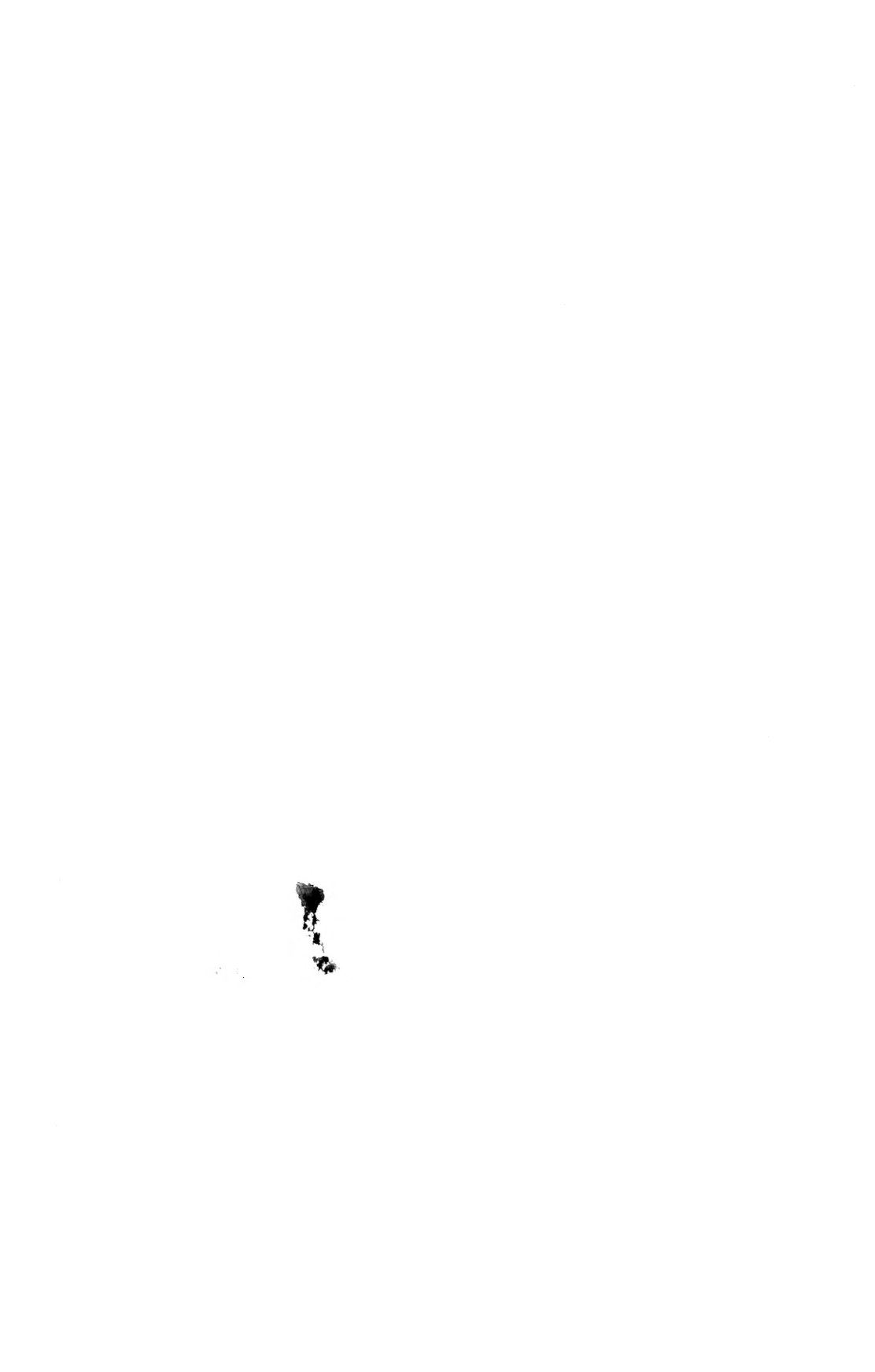
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